AUGUST 11, 1956
VOL. 151 — NO. 6

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

TOLL DIALING

Modern toll switchboard in Owosso, Mich. exchange of Union Telephone Co. It is provided with key pulsing and necessary features for exchange to tie in with intertoll dialing system.

Published every week on Saturday by TELEPHONY PUBLISHING CORP. 540 S. Dearborn St., Chicago 5, Ill. Subscription $5.50 per year. Entered as second class matter at the Post Office at Chicago, Ill., under the act of Mar. 3, 1879.

Guaranteed Circulation This Issue
11,326 of Which 10,808 is Paid

MANAGEMENT • PLANT • TRAFFIC • COMMERCIAL • LEGAL • ACCOUNTING

XUM

DETAILS OF THE AERIAL VIEW:

100% Booming

...and 100% XY®!

The aerial view reproduced here is of Calvert City, Kentucky. More than 75 million dollars of chemical plant construction has transformed this "little village" into a prosperous industrial center in only seven years.

To help solve its mushrooming communications problem, each of the six new industries uses an XY Dial PBX.

Our congratulations to *Calvert City Telephone Systems* for a wonderful "selling" job. It's another proof that XY is the top preference in today's independent world.

The XY F-40 and XY F-80 Dial PBX's are perfect for the business requiring trunk and internal service by dial, but with a minimum of space to house the equipment. Our folder T-146 gives full details. Why not ask for a copy today?

STROMBERG-CARLSON COMPANY
A DIVISION OF GENERAL DYNAMICS CORPORATION
ROCHESTER 3, NEW YORK

1. Pittsburgh Metallurgical Co.—an XY F-40 System being installed.
2. Pennsylvania Salt—an XY F-80 is in service.
3. B. F. Goodrich Co.—also has an XY F-80 installed.
4. National Carbide—an XY F-40 is in service.
5. General Aniline—XY F-40 being installed.
6. Air Reduction Co.—XY F-40 being installed.

XUM

"Line supplies are line supplies, what's so different about KELLOGG?"

Ed: Plenty, Bill. Kellogg gives us so many good reasons for going to them for all our materials and equipment.
It's not only the quality of their products, it's all the things that go to make up their line supply service.

Bill: For instance?

KELLOGG
A DIVISION OF I T & T

KELLOGG SWITCHBOARD AND SUPPLY COMPANY
A Division of International Telephone and Telegraph Corporation
SALES OFFICES: 79 West Monroe Street, Chicago 3, Illinois
Phone: DEarborn 2-0750

Ed: Delivery for one thing — it's fast and dependable. They've got a well stocked warehouse within quick-delivery distance and a flock of supplier distribution points in this area. The closeness of these supply sources has helped us out often in emergencies. Saves us money on shipping costs too.

Bill: That sounds ok.

Ed: Kellogg has always had everything we've ever needed, I don't care what it was. We can write out an order and know it will be filled. One source-for-everything also saves us a lot of time and paperwork.

Bill: Makes good sense.

Ed: And there's this important fact, Bill, no one has more experience than Kellogg in the handling of line supply orders. They seem to understand our problems and come up with the right answers. We leave a lot of decisions up to them and they always come through with the materials that fit our needs.

Bill: Good products, fast, dependable delivery and helpful service... you're right, Ed, I can see why it's always been Kellogg around here. Better keep it that way!

KELLOGG BRANCH WAREHOUSES AND OFFICES:

6000 W. 51st Street
CHICAGO 38, ILLINOIS
REliance 5-5445

4501 Truman Road
KANSAS CITY 1, MISSOURI
HUmboldt 7085

1594 Southland Circle, N.W.
ATLANTA, GEORGIA
Sycamore 4-2441

410 N. Syndicate Avenue
ST. PAUL, MINNESOTA
Nestor 5878

1515 Turtle Creek Blvd.
DALLAS 2, TEXAS
Prospect 6207

KELLOGG BRANCH OFFICES:

406 S. Main Street
LOS ANGELES 13, CALIFORNIA
Vandyke 6759

1663 Mission Street
SAN FRANCISCO 3, CALIFORNIA
Market 1-6011

1555 West Fourth Street
MANSFIELD, OHIO
Mansfield 7-2816

EXPORT DISTRIBUTORS:

International Standard Electric Corp.
50 Church Street, New York7, New York

UNITED STATES INDEPENDENT TELEPHONE ASSOCIATION

FLASHES AND PLUGS

SHAKESPEARE RELATED TO PRESENT. *Illinois Bell Telephone News* in a recent issue carried the following story:

Shakespeare and the telephone? An impossible combination, say you. Maybe so. But J. K. Torbert of AT&T's administration department has come up with some of Shakespeare's words that could be applied to modern telephone service.

Shakespeare "undoubtedly felt the need of something in the way of telephonic aid and his astounding genius for imagery intuitively sensed the approach of a new device," says Mr. Torbert, who taught English at the Massachusetts Institute of Technology before he joined the Bell System.

Here are a few of Shakespeare's words with telephonic captions as guilty of anachronism as many of the devices Shakespeare put into his plays.

THE TELEPHONE HOUR RADIO BROADCAST

"Do so;
And those musicians that shall
Play to you hang in the air
A thousand leagues from hence,
And straight they shall be here:
Sit and attend."

GLENDOWER IN ACT II, SCENE 1, HENRY IV.

THE TELEPHONE SPEAKS FOR ITSELF ON ITS SERVICES

Lear: "What services canst thou do?"

Kent: "I can keep honest counsel, ride, run, mar a curious tale in telling it, and deliver a plain message bluntly: that which ordinary men are fit for, I am qualified in; and the best of me is diligence."

LEAR AND KENT IN ACT I, SCENE 4, KING LEAR.

THE OPERATOR

"Her voice was ever soft, gentle and low,
An excellent thing in woman."

LEAR IN ACT V, SCENE 3, KING LEAR.

LONG DISTANCE SERVICE

"I have eyes upon him,
And his affairs come to me on the wind."

CAESAR IN ACT III, SCENE 6, ANTONY AND CLEOPATRA.

THE DIAL TELEPHONE EXCHANGE

"This is as strange a maze as e'er men trod;
And there is in this business more than nature
Was ever conduct of."

ALONSO IN ACT V, SCENE 1, THE TEMPEST.

THE FUTURE OF THE TELEPHONE

"Age cannot wither her, nor custom stale
Her infinite variety."

ENOBARBUS IN ACT II, SCENE 2, ANTONY AND CLEOPATRA.

TEEN AGE TELEPHONING

"Here will be an abusing of God's patience
and the king's English."

MISTRESS QUICKLY, ACT I, SCENE 4, MERRY WIVES OF WINDSOR.

CIRCULATION

Guaranteed circulation of this issue is 11,326 of which 10,808 is paid.

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY
Since 1901

August 11, 1956

CONTENTS

IN THE NATION'S CAPITAL 17
By Francis X. Welch

TROUBLE CLEARING—THE SINE WAVE FORM—Part 50 19
By L. N. Martin

THE PLANT MAN'S NOTEBOOK 21
By Ray Blain

TELEPHONY'S PBX ADVISERS' HANDBOOK 22
By Gilbert R. Brackett

CUSTOMER SECURITY ASSURES JOB SECURITY 26
By Paul K. Kaufman

COLLEGE JOURNALISM STUDENT REPORTS IOWA CONVERSION 27

COURTS AND COMMISSIONS 30

H. D. FARGO, Jr., *President & Advertising Manager*
R. C. RENO, *Vice President & Editor*
H. D. FARGO, *Vice President & Treasurer*
A. J. STULTS, *Secretary & Western Manager*
DAN S. FARGO, *Managing Editor*
FRANCES E. CRETCHER, *Associate Editor*
RAY BLAIN, *Technical Editor*
FRANCIS X. WELCH, *Washington Editor*
MAYME WORKMAN, *Traffic Editor*
VIVIAN RYDEN, *Circulation Manager*

WESTERN REPRESENTATIVES:
McDonald-Thompson, San Francisco, Cal. Also offices in Los Angeles, Seattle, Dallas and Houston, Tex.; Tulsa, Okla., and Denver, Colo.

Vol. 151, No. 6. Published every week on Saturday by TELEPHONY PUBLISHING CORPORATION, 608 South Dearborn St., Chicago (5), Ill. 20 cents per copy (except special issues). Subscription $3.50 per year U. S.; $4.50 Countries in U. S. Spanish Postal Zone; $4.50 Canada; $5.50 Other Countries.

Telephone WA bash 2-2435

BLAW-KNOX TOWERS
...a worthwhile investment*

After thorough consideration of alternate methods, The Peoples Telephone Corporation, Butler, Pennsylvania, found a Microwave Carrier System the best solution to handling the increasing number of calls between Butler and Gibsonia, Pennsylvania, a distance of 20 miles.

The 200′ Blaw-Knox tower shown here plays an important role in the complete Microwave Carrier Package which was engineered, furnished and installed by Lenkurt Electric Company and Automatic Electric Sales Corporation.

In addition to being the most economical system to install, this Microwave System also provides the company with important maintenance benefits. The "right-of-way through the sky" reduces system maintenance to a minimum, regardless of severe summer electrical storms or winter ice storms. And the sturdy Blaw-Knox hot dip galvanized steel tower has built-in provision for additional parabolic antennas as service may be extended to other areas.

Write today for Booklet 2516, which illustrates Blaw-Knox Microwave Towers and describes Blaw-Knox tower engineering, design, fabrication and erection services.

BLAW-KNOX COMPANY
BLAW-KNOX EQUIPMENT DIVISION
PITTSBURGH 38, PENNSYLVANIA

*Closing statement from 1955 Annual Report to stockholders: Peoples Telephone Corporation, Butler, Pa. ". . . the microwave service has proven itself to be a worthwhile investment toward our continued efforts to improve our telephone communication."

50th Anniversary
BLAW-KNOX
1906-1956

MICROWAVE TOWERS

Guyed and self-supporting type towers for Microwave • AM • FM TV • Communications • Radar

Member

Not cat-napping . . .

XUM

...talking on the telephone!

Automatic's Type 88 Loud-Speaking Telephone makes the day go easier (as you can see!) It leaves the user's hands free, *while telephoning*—helps get more work done... faster. That's why so many busy businessmen are glad to pay extra for it!

Telephone companies find it easy to provide this extra-revenue service. The Type 88 comes as a handy "package" that includes everything necessary—Telephone (which has volume control, "On" and "Off" pushbuttons, microphone and "busy" light), Speaker, Control Unit, and wiring.

Home and office subscribers will thank you time and time again for the Loud-Speaking Telephone that makes their days easier and more productive. Plan to offer this extra-revenue service now. You'll be glad you did!

Every day new Loud-Speaking Telephone installations like this are bringing extra revenue to telephone men!

Write today for Circular 1857

Address: *Automatic Electric Sales Corporation, 1033 W. Van Buren St., Chicago 7. Or call, HAymarket 1-4300.*

AUTOMATIC ELECTRIC

ORIGINATORS OF THE DIAL TELEPHONE

We think you'll like
our company, too!
LEICH
LEICH SALES CORPORATION, 427 WEST RANDOLPH STREET, CHICAGO 6, ILLINOIS

ARKANSAS ASSOCIATED TELEPHONE COMPANY
516 V. F. W. BUILDING
34TH AND BROADWAY
KANSAS CITY 11, MO.

May 24, 1956

Mr. Willard Dobbeck
Superintendent Equipment Engineer
Leich Electric Company
Genoa, Illinois

Dear Mr. Dobbeck:

Thank you! Thank you and all of those at Leich who played a part in helping us during our recent emergency at Lake City, Arkansas.

At 11:00 a.m. Sunday, May 20th, I received a call from Mr. W. L. Bryant at Lake City advising that lightning had destroyed our power panel and associated equipment at Lake City causing the entire exchange to be out of service.

A few minutes later I was relaying the story of our plight to you by telephone and your promises of immediate action were very gratifying. More gratifying than this, however, was the rapid fulfillment of your promises, evidenced by the fact that an installer and all of the necessary equipment to put us back in operation arrived by air at Memphis, Tennessee at 12:00 midnight of that same day - just a little more than twelve hours after I first called you!

Through our years of doing business with Leich we have found such service as this to be the rule rather than a rare experience.

This example and our past relations with your company has proven to us that service continues after installation and that we can rely on Leich at all times. This type of service has been extremely beneficial to us in providing good telephone service to our customers.

Thanks again.

Yours very truly,

ARKANSAS ASSOCIATED TELEPHONE COMPANY

Verne E. Hix
Plant Construction and
Maintenance engineer

VEH/mf

cc: Mr. D. C. Gibson, Pres.
Leich Sales Corporation
427 West Randolph Street
Chicago 6, Illinois

manufacturers of telephones, switchboards and related apparatus since 1907
PACIFIC COAST: 11401 WEST PICO BLVD., LOS ANGELES 64, CALIFORNIA
SOUTHWEST: 1227 SLOCUM STREET, DALLAS 7, TEXAS
GENERAL TELEPHONE SYSTEM

"They'll never catch me now. They're still down at the last pole!"

Our tired little fox friend is safe at last. Because that line is strung with Amertel 135, that last pole is a long way back.

Amertel 135 is high-strength, permitting longer spans. In bad weather it will withstand greater ice and wind loads than ordinary BB wire. It's better in other ways, too . . . superior transmission qualities, lower installation cost, lower maintenance costs.

Write today for more information to American Steel & Wire Division, Rockefeller Building, Cleveland 13, Ohio.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL
GENERAL OFFICES: CLEVELAND, OHIO

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS TIGER BRAND AMERTEL

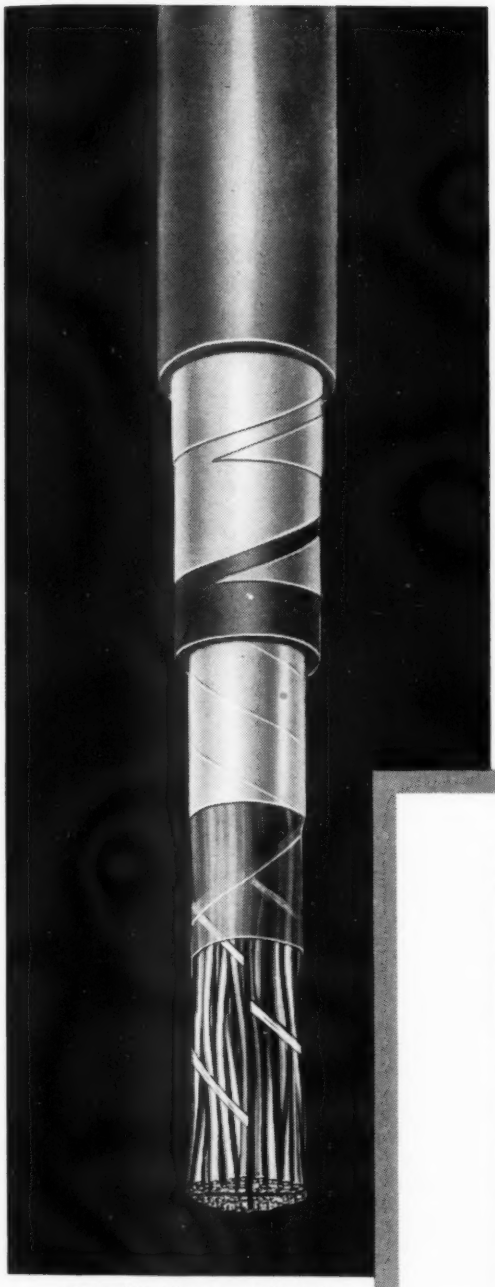
TELEPHONE & TELEGRAPH WIRE

UNITED STATES STEEL

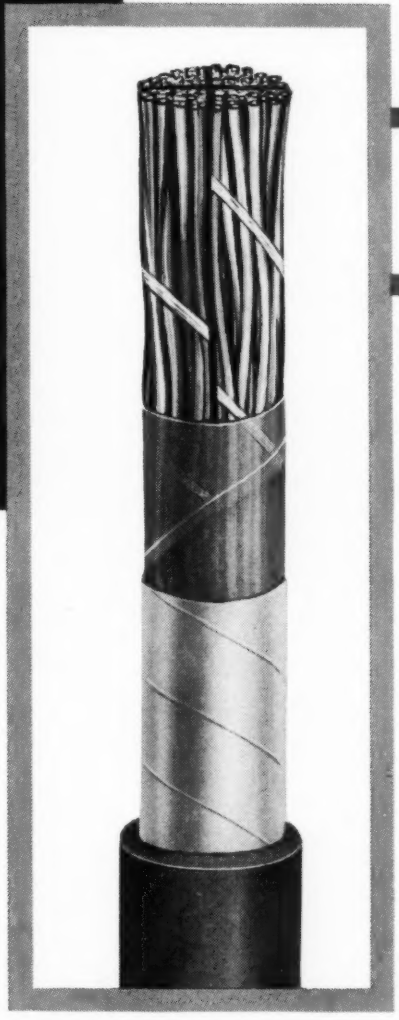
GENERAL CABLE QUALITY...

SUPERTEL

THERMOPLASTIC TELEPHONE CABLE



Type VII: direct earth burial



Type III: aerial and duct installations

SIZES 19, 22, 24
***and now in* 26, AWG**

Superior electrical quality and tough, high-molecular-weight polyethylene jacket ensure permanent high quality transmission. Withstands abrasion, bending, effects of sunlight or chemicals, low temperature deformation or cracking.

Distributed through
Automatic Electric Sales Corporation.

GENERAL CABLE CORPORATION
420 Lexington Avenue
New York 17, N. Y.
Offices and Distribution Centers
Coast-to-Coast.

for quality and service . . . **specify GENERAL CABLE**

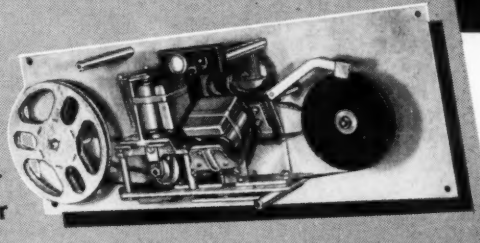
NORTH AuTollizer®

PRODUCED THIS TICKET

Automatically

SIMPLE AS 1-2-3

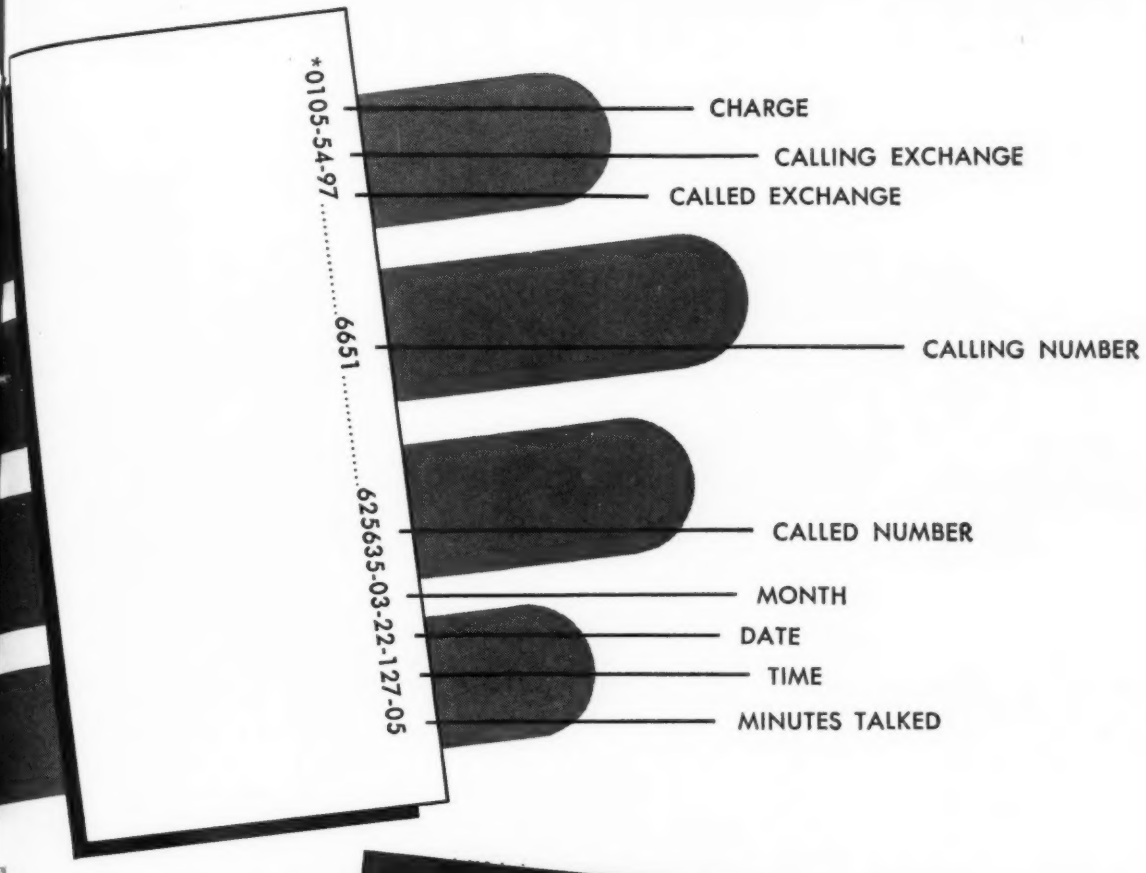
1 The NORTH Recorder made a perforated tape record of all the information necessary for billing the call.

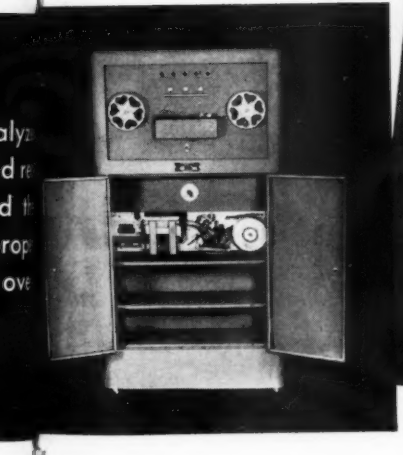


2 The NORTH Analyz "read" the punched re ord and computed t cost from the prop preset base and ov time rates.

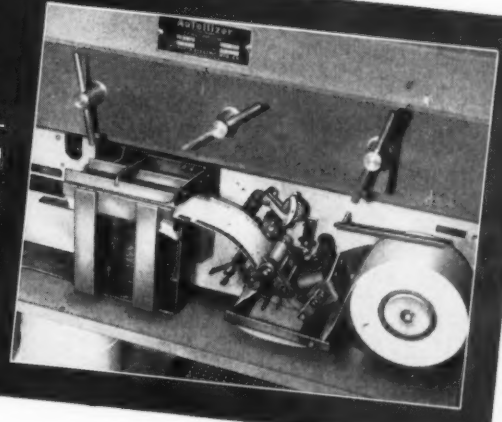
NORTH

XUM





3 The Teletype Printer reproduced the ticket all ready for the billing clerk.



All without handwork or headwork

The savings in labor are obvious — this steady night and day flow of **unsupervised** toll business becomes profitable with

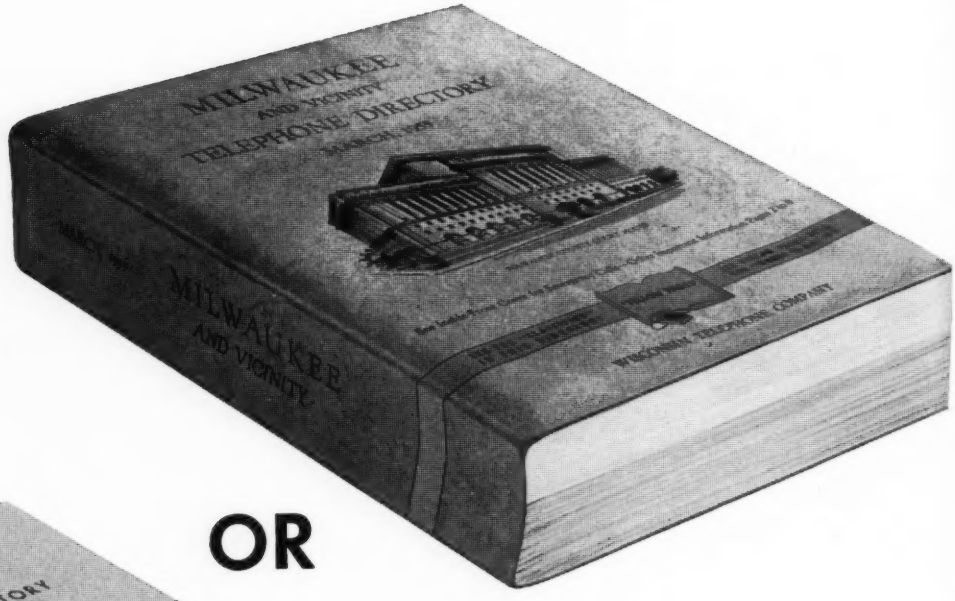
NORTH AuTollizer®

NORTH ELECTRIC COMPANY

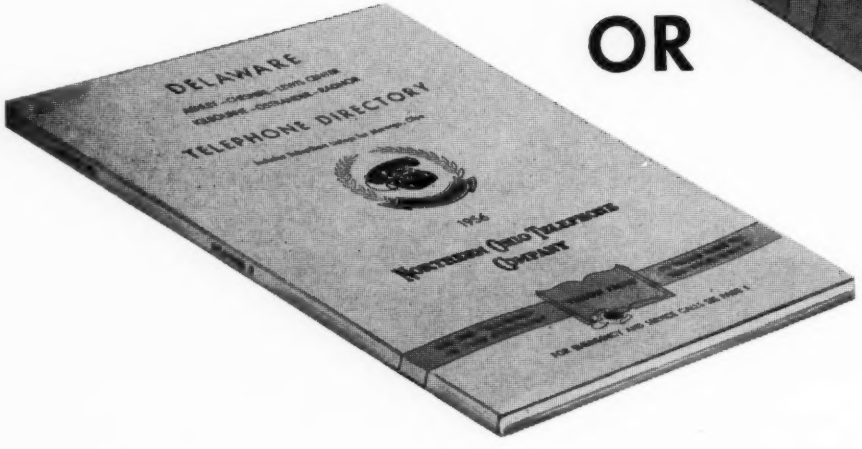
601 SOUTH MARKET STREET • GALION, OHIO

INCREASE YOUR PROFITS!

LARGE



OR



SMALL

L. M. BERRY & CO.

can handle your directory!

CALL OR WRITE TODAY FOR INFORMATION ABOUT HOW TO INCREASE YOUR NET REVENUE

Telephone Directory
Advertising Exclusively

General Offices • Hulman Building • Dayton 2, Ohio • Michigan 7421

IN THE NATION'S CAPITAL

BY FRANCIS X. WELCH, WASHINGTON EDITOR

Justice Department and House Committee in argument whether to make details of AT&T-Western Electric anti-trust suit settlement public. FCC expects strong reaction to its proposal to shift nation's television operations to UHF.

THERE IS A very important principle involved in the latest exchange of communications between the Justice Department and the House Judiciary Committee regarding the recent settlement of the anti-trust suit against the American Telephone & Telegraph Co., and Western Electric Co. That is whether offers, counter-offers, memoranda and discussions leading up to the settlement of such cases out of court should be confidential just as in any other kind of a law suit.

The alternative is to set aside anti-trust suits as a special class of litigation, in which the parties are not entitled to, and cannot expect, any privacy of communication. Parties to such cases would then be put on notice that every word they may say, or write, can be used against them in further proceedings (or even in proceedings, such as congressional committee investigations, which have nothing to do directly with the law suit involved). Needless to say, there would be mighty little incentive for the parties even to consider out-of-court settlements under those circumstances, and probably very few settlements would result.

The background of this Justice Department-Judiciary Committee exchange was this: Last Apr. 16, Representative Roosevelt (D. Cal.) made a speech attacking the settlement of the AT&T anti-trust suit. He headed a small business sub-committee which looked into the matter. And Representative Roosevelt felt that the AT&T had been given "favored and special treatment." The assistant attorney general, who handled the case for Justice Stanley Barnes (now a U.S. Circuit Court of Appeals justice) denied this. Barnes said the settlement was the best that could be obtained in the public interest.

But the full Judiciary Committee decided to look some more. First step was a request by its chairman, Representative Celler (D., N. Y.), to the Justice Department for the files relating to the settlement. On July 30, Celler revealed that the Justice Department had refused. The refusal was made in a letter of reply from Deputy Attorney General William P. Rogers, now handling such matters. He gave two reasons. First, he said it would transgress "presidential privilege"—meaning the right reserved by the Executive Branch of the Government to conduct its affairs independently of the other two branches. Again, Rogers said the release of such material "would violate the confidential nature of settlement negotiations." He said it also would "discourage defendants, present and future, from entering into such negotiations." Finally, Rogers said that the policy of the Department of Justice "does not permit disclosure of staff memoranda or recommendations."

This goes to the heart of the matter, which is the confidential character of statements, or proposals, made in an effort to secure out-of-court settlements. It has long been the policy of the courts to encourage such settlements, mainly to cut down on the work load of the courts which would quickly be overburdened to the point of utter collapse if every suit filed had to proceed to trial. But as the very word suggests, "settlement" necessarily involves compromise, give-and-take.

Most of us have had personal experiences with automobile damage suits, or other threatened litigation where the parties managed to get together and agree on a solution. Often, it is the court, itself, which asks them to get together and avoid the expense and delay of a full dress court trial.

But always such settlements are arrived at on the basis of offer and counter-offer, and an eventual compromise agreement on something less than originally demanded. The owner of a damaged automobile who sues for $10,000 finds he can get along on a $1,000 out-of-court settlement. His incentive is the old story of the bird in hand. He is sure of the $1,000 settlement. But if he went to court he might lose his case and the expenses of the law suit besides. The other party has the same incentive of minimizing his risk. He might win out, if the case went to court; or he might conceivably be stuck for the whole $10,000 in the end, or the best part of it.

It has always been the legal tradition, moreover, to regard these preliminary negotiations leading up to a settlement as *confidential*. All offers, statements or written memoranda used in these negotiations cannot thereafter be used as evidence. They cannot be used at all. The courts are very firm about that.

And we can see why. If the injured party to the $10,000 suit, already supposed, were able to use the other party's offer of $1,000 settlement in a subsequent trial — assuming that the settlement negotiations broke down—it would give him all the advantage and the other party none. His lawyer could say to the jury "the defendant says he is not guilty of negligence in this accident; but here's his letter proposing to settle with my client for $1,000. Doesn't that show that the defendant *admits* he is at least negligent to that extent?"

The same arrangements go on every day in all kinds of cases, even criminal cases. The lawyer for a man charged with assault and armed robbery suggests to the district attorney his client is willing to plead guilty to a simple assault. And the district attorney,

after weighing the evidence and the past record of the accused, will decide what are his chances of getting a conviction on the graver charge (if he tried the case) or getting a quick conviction on the lesser charge, to which the accused is willing to plead guilty. But in no event can the district attorney make a record of the defendant's proposal and then use it against him in a subsequent trial.

Judge Barnes, in explaining the terms of the AT&T settlement last April, frankly admitted that it was the judgment of the Justice Department (and that includes some top-rate legal specialists on anti-trust law) that it could never have gotten away, in court, with all the demands in the original suit against AT&T. These included absolute divorce between the Bell System and Western Electric and the dissolution of the latter. He had plenty of reason for such fears. The Justice Department's batting average on some of these giant anti-trust suits has included an increasing number of strike-outs in recent years. The most recent were two cases against the DuPont interests. So, Judge Barnes took what he could get—an agreement to confine Western Electric's activities to regulated Bell System operations.

Celler said it was "strange indeed" that the White House "freely supplies confidential information to a journalist who is neither elected nor appointed to office." This reference apparently was to a recently published book written by a New York reporter who was given access to White House files.

"Congressional examination is essential," Celler said, "to determine among other things, whether AT&T and its subsidiary, Western Electric, were given preferential treatment in this case by the Department of Justice."

The government's original suit sought separation of AT&T and its wholly owned subsidiary, Western Electric and dissolution of Western Electric into three separate manufacturing concerns on the ground it was an illegal monopoly. Western Electric is the major manufacturer of all telephone equipment sold in this country. The government dropped its original demand, and AT&T consented in a settlement decree issued last January to comply with certain other government demands with which readers of this department are already familiar.

Spreading Government Business

One of the basic policy questions with which the Administration and the Justice Department may have to come to grips, on this question of business consolidation, is whether anything can be done, *short of anti-trust procedure*, to aid the "independents" in various industries, now undergoing a period of concentration and consolidation. This policy question also involves whether anything should be done at all. It is not an easy one to answer.

The problem of industrial consolidation is best exemplified in the automotive industry, where the "big three" (General Motors, Ford and Chrysler) are threatening to run away with so much of the business that the two in-

(Please turn to page 33)

REA Approves Telephone Loans in Three States

Three loans to extend and improve rural telephone service in Iowa, Kansas and Colorado were made last week by the Rural Electrification Administration, the U. S. Department of Agriculture announced on July 31. The loans totaled $1,141,000. Details follow:

Wilton Telephone Co., Wilton Junction, Iowa, on July 24 was allocated $254,000, to improve and extend rural service in Cedar and Muscatine counties.

The borrower, a commercial corporation, proposes to provide dial service to 100 farm families now without telephones, and to 614 subscribers. The company now furnishes magneto service over 80 miles of line and provides switching to 164 farm families who own their own lines. It plans to acquire 38 miles of line from 123 of these switchers who wish to become regular subscribers of the borrower. The remaining 41 will continue as switchers in the expanded system.

Construction scheduled by the company includes 19 miles of line and an automatic central office at Wilton Junction. About 53 miles of the present line will be used in the enlarged system, 54 miles rebuilt and the remainder retired. Part of the loan funds will be used to refinance existing indebtedness.

The completed system will consist of 126 miles of line over which 837 farm families in the area will receive dial service.

Herschel Flater is president and manager of the company.

*

Carter Telephone Co., Inc., Lane, Kan. (mailing address: Lenexa, Kan.), on July 24 was extended loan of $432,000, first REA loan, to improve and extend rural service in Anderson, Franklin, Linn and Miami counties.

The borrower is a commercial corporation which plans to bring service to 296 farm families and to furnish improved service for its existing subscribers. The company now provides magneto service to 411 subscribers over 215 miles of line, and switching service to 189 rural subscribers who own their own lines. Central offices are at Centerville, Greeley, Lane and Parker.

The Carter company proposes to construct 137 miles of line and automatic central offices at Greeley, Lane and Parker. The Centerville office will be abandoned and the subscribers in that community will be served through the Parker exchange. Of the present line, 175 miles will be rebuilt and the remainder retired.

Raymond E. Carter is president and manager of the company.

*

Plains Cooperative Telephone Assoc., Inc., Kirk, Colo., on July 27 was extended a loan of $455,000, first REA loan, to improve and extend rural service in Kit Carson, Washington and Yuma counties.

The new cooperative plans to furnish service to 250 farms and other rural establishments in its area. It also plans to improve the service to 418 subscribers. As a nucleus for the new system, Plains proposes the following acquisitions: Airline Telephone Assoc. at Anton; the Vona-Joes Telephone Co. at Joes; the Independent Telephone Co. at Siebert; and access rights to the area of the South Vona Telephone Co. These facilities are now providing magneto service to 418 subscribers including 19 switchers.

Construction planned by the borrower includes 221 miles of line and automatic central offices at Anton and Joes and between Vona and Seibert. The cooperative proposes to rebuild 179 miles of the present line, use 168 in place, and retire the remainder.

President of the cooperative is James Donnelley.

The Sine Wave Form

By L. N. MARTIN

THE SINE WAVE is the most important and the most common of all wave forms. It is a natural wave form. The waves of the open ocean are sine waves. However, when whipped by a storm or when breaking on the shore, they are far from sine waves and thereby become harsh and dangerous to shipping.

Sound waves of the air caused by the human voice speaking or singing are sine waves or a combination of a number of different sine waves (Unless the voice is making harsh and discordant noises). The tone of a violin, piano, or organ is composed of a fundamental sine wave and one or more of its harmonics (Harmonics are waves whose frequencies are multiples of the frequency of the fundamental wave).

Most of the alternating currents used in telephony have the sine wave form or are intended to be of that form (Trouble may result if a current which is intended to have the sine wave form has in fact some other form). One important advantage of the sine wave in telephone work is that when it is relayed through a transformer or repeating coil the current in the secondary has exactly the same wave form as that in the primary. This is not true of any other wave form. However, for some special purposes other wave forms are used. For example, the "saw tooth" wave, which looks like the teeth of a rip saw, is used much in television and radar.

Our preceding article (TELEPHONY, May 26, p. 42) discussed the mathematical meaning of the word "Sine." If the reader is not thoroughly familiar with that subject he will profit by rereading that article at this time. Fig. 1 is a review as it duplicates a drawing in the previous article. The half circle is marked with dots at 10-degree intervals. From each of these dots a vertical line is drawn downward so as to meet the radius R or R′ at a right angle. Each of these vertical lines is the sine of the angle which is designated at its upper end.

PART 50. The preceding article in this series appeared in the May 26 issue, p. 42.

Each sine is also designated by a number which is the length of the sine when measured by the radius. Sine 90° is 1 as this sine is also the radius R″. 0° and 180° have no sine lines, therefore, we say that these sines are zero. All other sines are decimal fractions. Notice that the degrees are indicated from 0° on the left to 180° on the right and also from 0° on the right to 180° on the left. They may be counted in either direction. This does not affect the sines as sine 80° and sine 100° are the same; sine 70° and sine 110° are the same; etc.

We do not show the lower half of the circle, but it is a duplication of the upper half except that the degrees run from 180 to 360 and the sines are *negative*.

Notice that between 0° and 90° the sines increase in length and in numerical value but not at a constant rate. As the sines increase, the *rate* of increase *decreases*. Thus, sine 20° is almost twice as long as sine 10°, but there is very little difference between sine 80° and sine 90°.

We will now construct a sine wave (*Fig. 2*) to represent the output of a 20-cycle generator having a maximum voltage of 70. (Note: The *effective* voltage, or the voltage which would be indicated by an ac voltmeter, would be .707 x 70 or 49.49 volts.)

We first "unwrap" the circumference of a circle and stretch it out in a straight line. This is the scale of degrees at the bottom of *Fig. 2*. As explained in a previous article this is actually a scale of *time*. Three hundred and sixty degrees represents the time of one cycle which is 1/20 second. Therefore, each degree represents 1/360 of 1/20 of one second or 1/7200 second.

We know that at 0° the voltage of the generator is zero, therefore, we place a dot where 0° and 0 voltage meet. We also know that the generator reaches its maximum voltage at 90° and that this voltage is 70. We, therefore, place a dot at the intersection of 90° and 70 volts. Now we find from a printed table of the functions that sine 10° is .1736. However, this is the fraction of 1 that this sine represents and we want the fraction of 70. This is a problem in proportion. The old school arithmetic would state it this way: .1736:1::?:70, which is read: .1736 is to 1 as what (?) is to 70. This is solved

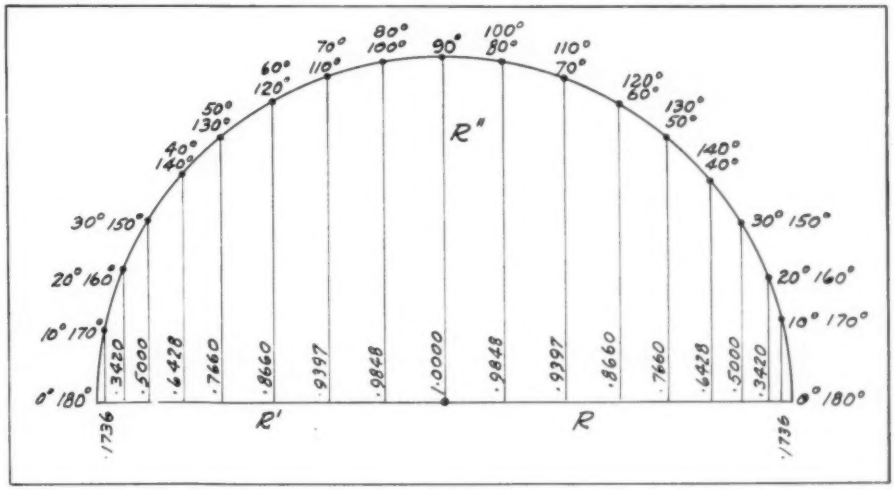


Fig. 1

by multiplying .1736 by 70 and dividing by 1. However, since dividing by 1 does not change anything, this becomes .1736 x 70=12.152. Since we can use but one decimal place in this small drawing we reduce this to 12.2 and make a dot at the intersection of 10° and 12.2 volts.

For sine 20°, the table gives us .342 which multiplied by 70 gives 23.94. We, therefore, place our next dot at the intersection of 20° and 23.9 volts. We continue with this method until we have spotted the voltage at 10° intervals up to 90°. The voltages from 90° to 180° are the same but in reverse order. Sine 190° is the same as sine 10° but is negative. Therefore, we place the dot below the zero line at -12.2 volts. We now continue in the same way until we complete the cycle at 360°. The final step is to sketch in a curved line from dot to dot.

The foregoing exercise shows us how the sine wave is constructed and gives us a mental picture of its appearance. However, there may be some confusion about its appearance. An easy way of depicting a sine wave is to draw a series of semi-circles with every other one inverted. This is always correct.

However, it is just a matter of choosing the two scales: The time scale and the voltage or current scale. If we make the scales so that 90° on the time scale is the same distance as the maximum voltage or maximum current on the vertical scale, the curve will be a series of semi-circles. In the curve which we have just constructed the distance which represents maximum voltage is almost twice as great as the distance which represents 90°. Therefore, the curve appears to be crowded or squeezed horizontally. This is sometimes necessary, especially if we wish to depict several cycles.

In our opinion, the sine wave is a "thing of beauty." It is seen every where in nature. Even the sand on the sea shore when the tide goes out, is arranged in a pattern of sine waves. It *sounds* good too. A sine wave produces a pure musical tone which is enriched if there are also harmonics. If "rung in the ear" in an exchange where the ringing current is furnished by a rotary generator, there is no shock. It may be loud but is not painful.

On the other hand, has any of our readers ever had the misfortune to be rung in the ear by a 66 2/3-cycle ringing current furnished by the vibrating or pole changer type of machine with its sharp cornered wave form?

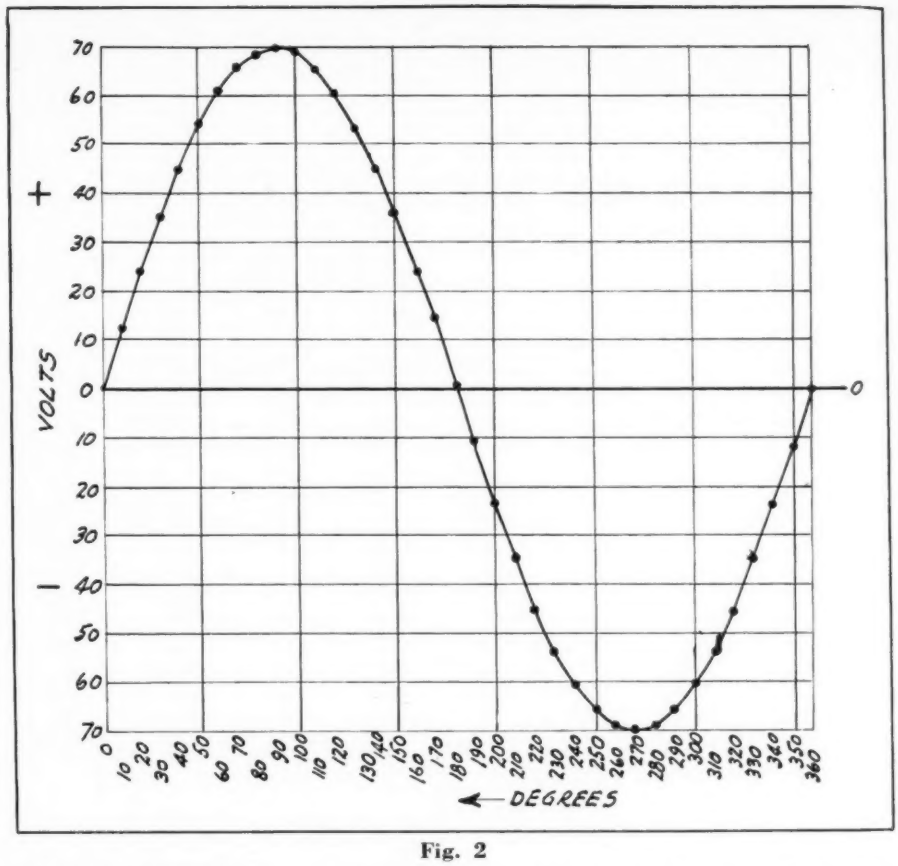


Fig. 2

A circular motion may be broken down into two components at right angles to each other such as horizontal

(Please turn to page 34)

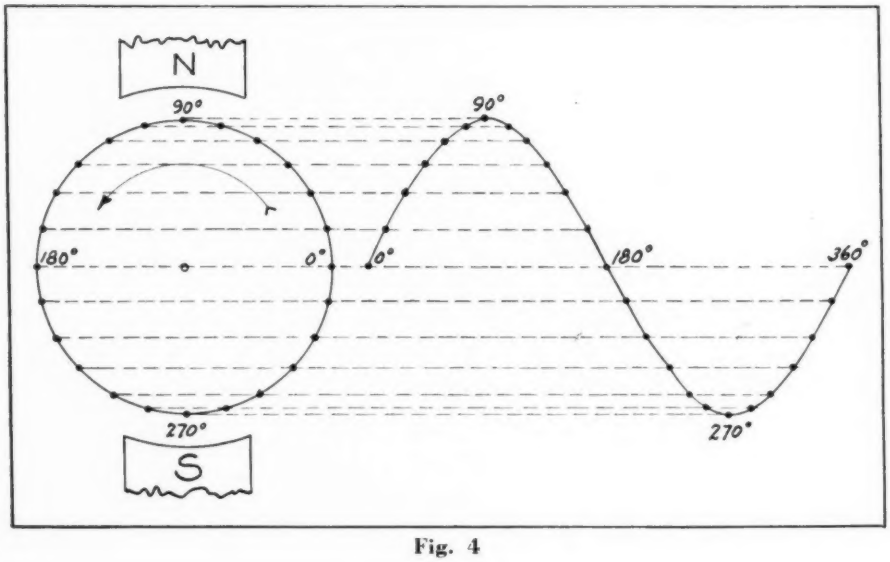


Fig. 4

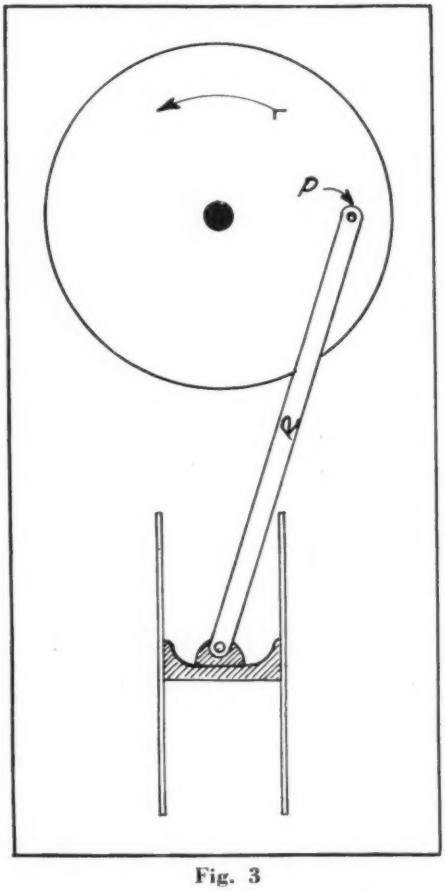


Fig. 3

THE Plant Man's Notebook

BY RAY BLAIN, TECHNICAL EDITOR

WE QUOTE the following interesting letter received from Mr. C. M. Rogers, divisional engineer, primary works division, lines section, engineering branch, Adelaide, South Australia:

"As an engineer in the Postmaster General's Department in South Australia, I have been supplied regularly with copies of your TELEPHONY magazine and have found them of great interest, particularly from the outside plant engineer's point of view. My work consists chiefly of underground conduit and cable construction, and the control of mechanical aids generally.

"For many years, we have been searching for a really satisfactory means of laying cables or conduits under roads and railways without disturbing the surface.

"We have now developed, in cooperation with Proline Mfg., Ltd., an underroad boring machine, operated from the power takeoff of a tractor which has practically eliminated the need for excavation of major roads and railways.

We have completed about 95 of these crossings in 12 months, including time spent in developing and adapting the machine and in learning the technique of operating it successfully.

"These 95 crossings include bores of 7½-inch, 9-inch, and 15-inch diameter, of lengths up to 63 feet and depths necessary to obtain cover and clear obstacles.

"The savings have been considerable in time, labor and money, and the general public has benefited due to reduction of interference to traffic and damage to road surfaces. Savings on important railway crossings have been noted particularly because of the impossibility of doing any trenching during normal working hours due to heavy rail traffic.

"One of the most striking features of the machine is its ability to bore fairly hard rock. It has penetrated concrete manhole walls up to 10 inches in thickness with a 7½-inch diameter hole at the end of a long bore. The removal of spoil dry along the continuous flight auger without the use of water injection is a very desirable feature.

"We are also fitting a vertical posthole borer to the rear of the same tractor to assist in making the excavation for setting up the machine for pot-holing roads, where necessary, for boring pole holes, and excavating for manholes and pits. It is expected that further savings in labor and time will result.

"With the continued development of telephones throughout the city and country towns, particularly along our major roads, we find the Under-Road Boring machine practically indispensable and a heavy list of bookings has been made for metropolitan and country use.

"I feel sure that telephone companies throughout America have problems very similar to our own, and I shall be very pleased indeed to hear from engineers who may be interested and will be pleased also to forward any information you may desire.

"Application for patent rights in U.S.A. has been lodged by Mr. R. A. Lines, of Proline Mfg., Ltd., and myself as co-inventors. Wishing you every success with *The Plant Man's Notebook*, I am, yours faithfully, C. M. Rogers."

It is always good to hear from our friends from "down under" for they always have an interesting story to tell.

•

We have often heard about counterfeit parts invading the automobile industry and the harm that they have caused. We never thought that this could happen to the telephone industry, but, much to our surprise, it has to a limited extent. However, we seriously doubt if counterfeit parts will make much headway in communications because of their obvious potential harm.

Recently, we inspected some wipers to be used on a step-by-step dial switching system. These wipers were exact copies of the real article, but the material used was not correct. Proper tension could not be maintained and in some cases the wipers cut the line banks.

Another case to come to our attention was a beautiful copy of a telephone dial. Here, again, proper materials were not used and correct tolerances had not been maintained. After a few months use, these dials were discarded as useless.

Operating telephone companies should not be tempted to purchase counterfeit parts because of their low cost. Actually, they will prove more expensive in the end.

It is always best to purchase repair parts from the manufacturer of your particular equipment. These established concerns have profited by their own mistakes down through the years and have developed a know-how that can never be built into even a reasonable facsimile.

•

We Americans are perhaps the most impatient people in the world. Frequently people will let a telephone ring two or three times and if they don't get an answer, they will hang up.

It is most annoying to rush to a telephone and hear only the dial tone when you take the handset out of the cradle. This is especially true when one is out in the yard during the summer months. We believe that operating companies should insist that calling parties wait for the fifth or sixth ring before hanging up.

•

Small radio receivers, called "Audiopages," will receive instructions from control points for American Broadcasting Co.'s roving commentators during the coming political conventions.

These small personal magnetic receivers, which weigh only an ounce, are not audible to anyone but the wearer, who hears through a tiny earpiece. The unit operates only within the restrictions of a wire loop strung around the area.

This device can be used where conventional paging systems prove impractical.

•

Gossip has been defined as letting the chat out of the bag.

Section 19 (Continued)

(4) *Failure to Reply to Calling Parties' Request.* The calling party does not know his request has been understood unless something is said to him in reply. The caller is not encouraged to wait while his call is being completed.

CAUSE A. *Lack of appreciation of the importance of replying to caller's request.*

CORRECTION—Instruct on the importance of getting the call off to a good start by acknowledging. Convince attendant that such service gives the impression of alertness, courtesy and efficiency.

CAUSE B. *Indistinct voice.*

CORRECTION—Observe the attendant's voice delivery, enunciation and inflection. Inform attendant of any fault needing attention, and have her practice feature until improved. The attendant's voice is the most direct expression of her inner-self. She should be careful, through it, to do herself full justice.

CAUSE C. *Unsatisfactory transmission.*

CORRECTION—Check attendant's posture. The voice cannot come out if the lungs are collapsed by poor posture. Does attendant have the worst of all habits —turning her head away from her transmitter?

CAUSE D. *Unsatisfactory headset adjustment.*

CORRECTION—Explain that headset should be adjusted for the attendant's posture after she is seated in an operating position rather than while she is standing. The top of the transmitter level with the top of the lips, the outer edge of the transmitter at the center of the lips, adjusted one half inch away from mouth.

CAUSE E. *Cutting out too quickly.*

CORRECTION—See Item (5)—"Cutting Out Too Quickly."

(5) *Cutting Out Too Quickly.* This practice is a potential cause of errors. It leaves an impression of impatience, annoyance, and even discourtesy.

CAUSE A. *Attendant does not understand what effect cutting out too soon will have on calling party.*

CORRECTION—Accent the need for courtesy, accuracy and speed without abruptness. The impression the calling party gets of the whole firm is governed greatly by attendant's deportment on the line.

CAUSE B. *Good technique sacrificed for speed in operating.*

CORRECTION—Watch attendant closely to see if she speaks after closing talking key. Explain importance of letting calling party complete request. Some people are naturally slow talkers; others use more words than necessary; to leave either type while they are talking is an unforgivable discourtesy.

TELEPHONY'S
PBX Service Advisers' Handbook
By Gilbert R. Brackett
August 11, 1956
Page 2

(6) *Unsatisfactory Speech and Manner.* Irritates the caller and leaves an impression unfavorable to the attendant and the firm she works for. Can be the cause of errors. Increases the operating time to complete the call. Makes attendant's work needlessly difficult and unsatisfactory.

It sometimes starts a cycle of irritation that builds up in chain-letter fashion until the day is made unhappy for many people.

CAUSE A. *Indistinct voice.*

CORRECTION—Observe attendant's manner of speech, enunciation, rate and volume of speech. If possible, have attendant record voice on tape recorder.

CAUSE B. *Faulty inflection or emphasis.*

CORRECTION—Look for monotone in attendant's voice. Point out the effectiveness of a well-modulated, pleasant voice.

CAUSE C. *Poor transmission.*

CORRECTION—Check attendant's posture. Check her tendency to turn head away from transmitter. Have plant department check trunk transmission if fault seems to be in these facilities.

CAUSE D. *Poor headset adjustment.*

CORRECTION—Headset should be adjusted for posture after attendant is seated in operating position, not while standing—top of transmitter even with top of lips, the outer edge at the center of the lips, adjusted to one half inch from mouth.

CAUSE E. *Overloaded condition.*

CORRECTION—Do the tricks provided and the distribution of lunch and relief periods meet with the needs of traffic at all times? Do other duties interfere with attendant's first call to duty—operating her switchboard? Are there sufficient trunks, extension equipment and switchboard positions?

CAUSE F. *Unhappy, dissatisfied state of mind.*

CORRECTION—Is the attendant in good health? Are attendant's relief periods sufficient? Does attendant have good personal relations with other employes? Does she ever discuss her problems with her boss to avoid unfair criticism of her work? Does attendant ever thank the extension people when they help her by answering promptly and correctly?

CAUSE G. *Lack of appreciation of the importance of satisfactory speech and manner.*

TELEPHONY'S
PBX Service Advisers' Handbook
By Gilbert R. Brackett
August 11, 1956
Page 3

CORRECTION—Set a high example when you deal with attendants, customer management and extension users. The attendants inner feelings determine to a great extent the impression made by her voice.

(7) *Unnecessary Requests to Repeat Orders.* Repetition leaves the caller with the impression that the attendant is uninterested and likely inattentive and careless. It delays the completion of the call and causes the attendant more work.

CAUSE A. *Inattention.*

CORRECTION—Check ventilation, heating and lighting conditions. Anyone of the three could cause attendant to become lethargic or depressed.

CAUSE B. *Lack of confidence.*

CORRECTION—Discuss with the attendant the need for becoming thoroughly familiar with frequently called names and the numerous ways orders could be received. Have attendant discuss telephone problems with the "boss." He will understand and be less likely to criticize her work. Have her compliment the extension users who do a good job for her—the results may surprise her.

CAUSE C. *Difficulty in hearing.*

CORRECTION—Is switchboard located in a noisy room? Does receiver fit snugly against the attendant's ear and set comfortably on her head? Does attendant have physical handicap that might affect hearing?

(8) *Failure to Report Progress on Delayed Calls.* If progress reports are not given to calling party he will not know his call is receiving attention. He cannot signal attendant to change his order or to communicate with her for any other reason. The party calling may abandon the call, if he isn't told occasionally he hasn't been forgotten.

CAUSE A. *Attendant fails to identify connection needing attention.*

CORRECTION—Check rotation of cords. Does attendant use key sleeves? Does attendant note details of call when calling party is waiting, delayed by a busy or other cause?

CAUSE B. *Failure to observe the relative order of attention to signals.*

CORRECTION—Explain order of attention to signals and why: (1) Recall signal, (2) progress reports, (3) incoming trunk signals, (4) extension signals, (5) disconnect signals.

(Section 19 to be continued next week)

DOW

GIVE HIM THE RIGHT TOOLS FOR THIS JOB!

DOW WEED AND BRUSH KILLERS provide an effective, money-saving vegetation control program.

Ask the men who man the axes. Brush and weed control is tough and tedious. And manpower is worth money today! Check the figures—cutting is a time-consuming, reoccurring and costly expense.

Better Control With Chemicals

Sure, you've got to keep right-of-ways clear—to minimize service interruptions, outages, reduce fire hazards and to guard the safety of repair crews. But give the crew the right tools to work with—Dow weed and brush killers.

Investigate Dow programming—the proper use of the right chemical specifically designed to control problem species in your area. Dow herbicides give better kill, control regrowth longer—at lower costs.

Special Chemicals for Brush, Grass

Try Esteron® 245, Kuron® or Esteron Brush Killer on trees or brush. Available for use with either petroleum or water carriers. They combine hard-hitting power with low drift, low toxicity qualities. Try Radapon*, containing dalapon sodium salt, the amazing systemic grass killer.

BARON—Complete Weed Control

Use Baron*, a semisterilant for control of broad and narrow-leaved weeds. It is ideal for use around substations, storage areas and plant sites.

Application techniques are simple—your own crew can do the job—or we'll be happy to recommend a custom applicator near you. We'll be glad to send cost figures showing how other people saved money by using Dow selective herbicides. Write THE DOW CHEMICAL COMPANY, Industrial Section, Agricultural Chemical Sales Department, Midland, Michigan.

*Trademark of The Dow Chemical Company

you can depend on DOW AGRICULTURAL CHEMICALS

DOW

Max E. Wettstein has been President and General Manager of the Florida Telephone Corporation since 1953. His 25 years of active service with the Company in varying capacities makes him well qualified to serve as its chief executive officer. Mr. Wettstein's thoughts about Graybar are presented below.

"We have always valued highly our relationship with Graybar"

The growth of the Florida Telephone Corporation in the past ten years has been extensive. Total telephones in service have increased from about 9,000 to nearly 30,000 and now, a continuing major project is even greater expansion to keep up with subscriber needs in this fast-growing State.

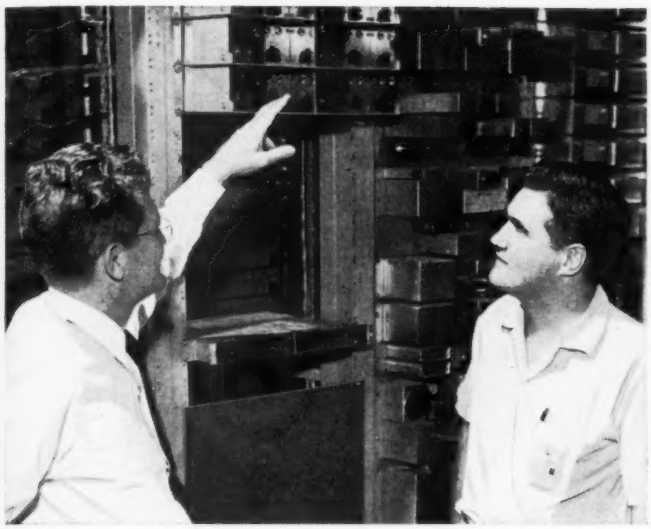
Concerning Graybar — Max E. Wettstein, President and General Manager of the Florida Telephone Corporation, says:

"Graybar has furnished us with line supplies, telephone instruments, cable and all of the various and sundry items comprising basic telephone plant for a long period of years.

"Throughout these years, we have experienced excellent Graybar service and have enjoyed the use of their quality products. Graybar has given us a specialized service through their experienced local representatives and nearby warehouse facilities which we feel is unsurpassed. In normal operations and in the many instances involving special treatment of urgent orders, Graybar has always come through to our complete satisfaction.

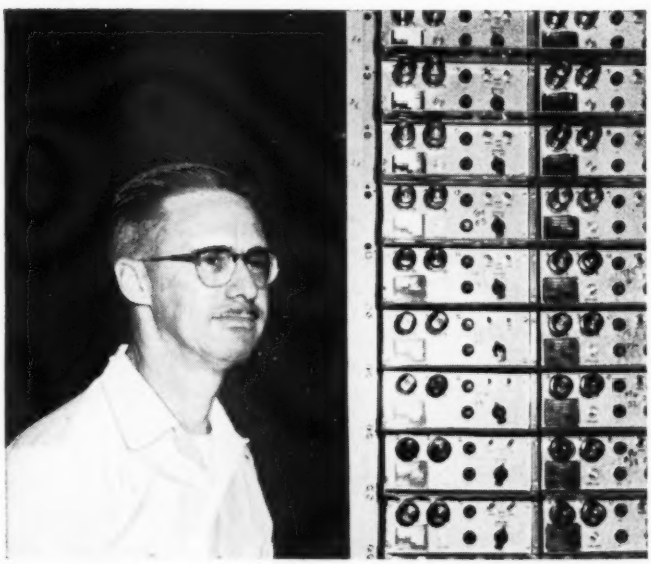
"We have always valued highly the fine relationship which Graybar and Florida Telephone have had with each other".

Thanks, Mr. Wettstein—we feel the same. And that's the way we operate throughout the United States, too. Many independent telephone companies rely on Graybar's warehouse system to carry their inventory. Pole line supplies for maintenance and new construction . . . central office equipment . . . subscriber carrier and toll circuit carrier . . . linemen's tools and safety equipment — all are conveniently available from Graybar located nearby. You too can benefit from Graybar's services. Call us for any telephone need. Like you, we are proud of our independent status. Graybar is owned solely by its operating and retired employees.



New Lynch B112 repeater installation is inspected by R. D. Eshbaugh, Chief Equipment and Building Engineer, and W. C. "Spec" Winfree, Graybar Manager of Communication Sales (pointing). The Florida Telephone Company now operates 18 exchanges and 5 subexchanges in eight counties in Central Florida. An accelerated expansion and improvement program will soon see its five remaining manual exchanges converted to dial operation.

Progress of a construction crew building additional rural lines is checked by Ralph Oswald, Plant Engineer, and Charles Whitaker, Line Foreman (left and right background). For both new construction and everyday maintenance, Florida Telephone management recognizes the importance of quality tools and supplies that their line crews know and respect and which are quickly available from Graybar.



H. G. Williams, Equipment Maintenance man, stands before the Lynch B112 repeater bay in the Winter Garden Toll Center and Exchange Building which was constructed in 1954. These repeaters are used with a new cable recently installed between Apopka and Winter Garden to expand facilities to the Winter Garden Toll Center.

Here Graybar Salesman John Coleman and General Plant Supervisor and Purchasing Agent John Riggs, at right, interrupt their discussion of a list of telephone supplies ordered from Graybar to smile for the camera. Graybar's specialized services and experienced personnel have done much to cement the healthy relationship between it and the Florida Telephone Corporation.

614-238

Call Graybar first for...

GRAYBAR ELECTRIC CO., INC.
420 Lexington Avenue
New York 17, N. Y.

GraybaR QUALITY *Everything Electrical*

IN OVER 130 PRINCIPAL CITIES

Customer Security Assures Job Security

By PAUL H. KAUFMAN

WHAT ARE THE workers of today looking for? Is it a high rate of pay, chances for advancement, or just what is the most important desire of the day?

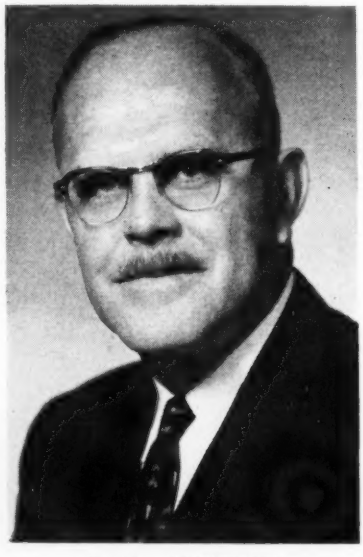
For many years the writer of this article had the privilege of serving in an advisory capacity to a group of college men, and they would frequently discuss their plans for the future. Their thoughts seemed to agree with those who came seeking employment with the telephone company. Their first consideration was, "Does the job offer *security?*" Perhaps this is not strange when we realize they were youngsters during the depression of 1930.

A great deal can be said about job security, as there are many interesting facets to the question. We cannot help but wonder what our America would be today if our forefathers had thought only of job security. Our nation became great because those pioneers had the spirit of adventure and dared to leave security and safety, and blazed a trail into the wilderness. They possessed courage, faith in God, and in themselves, and the result is the America we know today—the greatest nation in the world!

The All-wise Creator might well have chosen to give us a complete world, but in His wisdom he gave to us an unfinished world. He left cities unbuilt, oil and minerals in the soil, electricity in the heavens, forests unfelled and bridges unbuilt so that we too might share in the joys of creation and at the same time keep alive the spirit of adventure. Too much emphasis can be placed on security, yet we are well aware of the responsibility which man has to his family. The purpose of this article is to show that real security is not something which is given to us, but a condition we make for ourselves.

Mr. Kaufman is director of public information of the Northern Ohio Telephone Co. of Bellevue, O.

Many fail to recognize the relationship between good public relations and job security. Actually, the only worthwhile security might well be called customer security. It is the customer who buys commodities and services and thus creates jobs and furnishes the funds to meet the payrolls. Business must manufacture commodities or provide services which are acceptable to the public, and at a price which is



P. H. KAUFMAN

equitable to the consumer, employe and investor. In our business we must provide a good grade of telephone service, at a fair price, and conduct our affairs in such a manner as to win and hold the approval of the public. And in this way we attain customer security, which is tantamount to job security.

Employes play a most important role in this question of customer security. Service is our only product and so it is most important that we be courteous and cooperative with our subscribers. We must also recognize that as more and more of our exchanges are converted to automatic operation, many of the opportunities for a personal contact with our customers are being removed. In many unattended automatic exchanges our subscribers rarely see a representative of the telephone company. Add to this the fact that more and more subscribers mail their payments to the telephone office, and you cannot help but recognize this as one of the many challenges which face the telephone companies. How are we to meet this problem?

First of all, we must train the personnel who do come in contact with our subscribers—they must be efficient, courteous, and must in all dealings with our subscribers exhibit a genuine desire to be helpful. They must be trained to be real good-will emissaries of the company. They must know and understand the plans and policies of the company. These employes should be active in the civic, social and fraternal life of the community in which they live and work. Remember, to their friends and acquaintances, they *are* the telephone company.

The company must take its place in the communities in which they serve. We must advertise our company, and our services. Many subscribers are not aware of all the services which are available. It should be our aim to provide a *complete service* to all subscribers. If the public is to be understanding, we should keep them informed as to our plans and policies. This can be done by advertising, news releases, program services, and open houses. Working together, the employes and the company can build a respect and appreciation which is invaluable to any business.

The telephone business has been built on courtesy and friendliness. It is a tradition which has been preserved through the years and must be maintained.

This friendliness and courtesy must be demonstrated whenever a customer orders a telephone, places a call, or has a visit by a representative of the telephone company. Our exchanges have grown up in the communities which they serve, and our subscribers look to the telephone company for that "Service With a Smile."

From the first day of employment each employe must accept the responsibility of building and maintaining good public relations in every contact with the public. We might well reverse that old adage and say, "A company is judged by the people it keeps." Through the character and quality of employes the company can make many friends, and the reverse may also be true.

Job security? Much depends upon the employe himself. By doing his job

in a workmanlike manner, by courteous and friendly dealings with the public, he is building good public relations for his company, thus assuring customer security, which is the real job security in which he is interested.

College Journalism Student Reports Iowa Conversion

[**EDITOR'S NOTE:** *The author of this article, Charles Stegmeir, is a graduate journalism student of Grinnell College and he selected as a reporting assignment the conversion to automatic operation of the Grinnell exchange of the Iowa Continental Telephone Co. We think Charles carried out his assignment admirably and feel that his report deserves publication in TELEPHONY. Through this assignment Charles, who resides in Evanston, Ill., has become quite interested in the telephone business. We take this opportunity to suggest to other telephone companies that they offer their conversion and expension programs as subjects for reporting assignments to journalism students in their areas. It's good public relations, it helps and encourages the students and, who knows, it might help the telephone industry by leading young men into its ranks.*]

* * *

ALL THE TELEPHONES in the Grinnell, Ia., area were converted to dial on July 8 as the Iowa Continental Telephone Co., a subsidiary of General Telephone Corp., climaxed a year marked by new additions in equipment and facilities.

Besides the dial equipment, the company boasts a brand new main building built for an estimated $200,000. Total cost of the new building, equipment, and cable was around $600,000. A new six-position toll switchboard also was installed.

President of the company is Joseph L. Van Horn of Grinnell. Douglas A. Barnes of Grinnell is controller.

The conversion to dial service took only a few seconds, but it had been in process for over two years. The decision to purchase automatic equipment was made in May, 1954. This equipment began to arrive on Dec. 1, 1955, and installation began on Dec. 15. Work on the actual changing of telephones began in both rural and city areas during May, 1955. In most cases, dials were merely added to the telephones in use, but many subscribers were given new telephones. The conversion made it necessary to install some new cables and string more wire as well as regrouping of subscribers in the rural areas.

CHARLES STEGMEIR

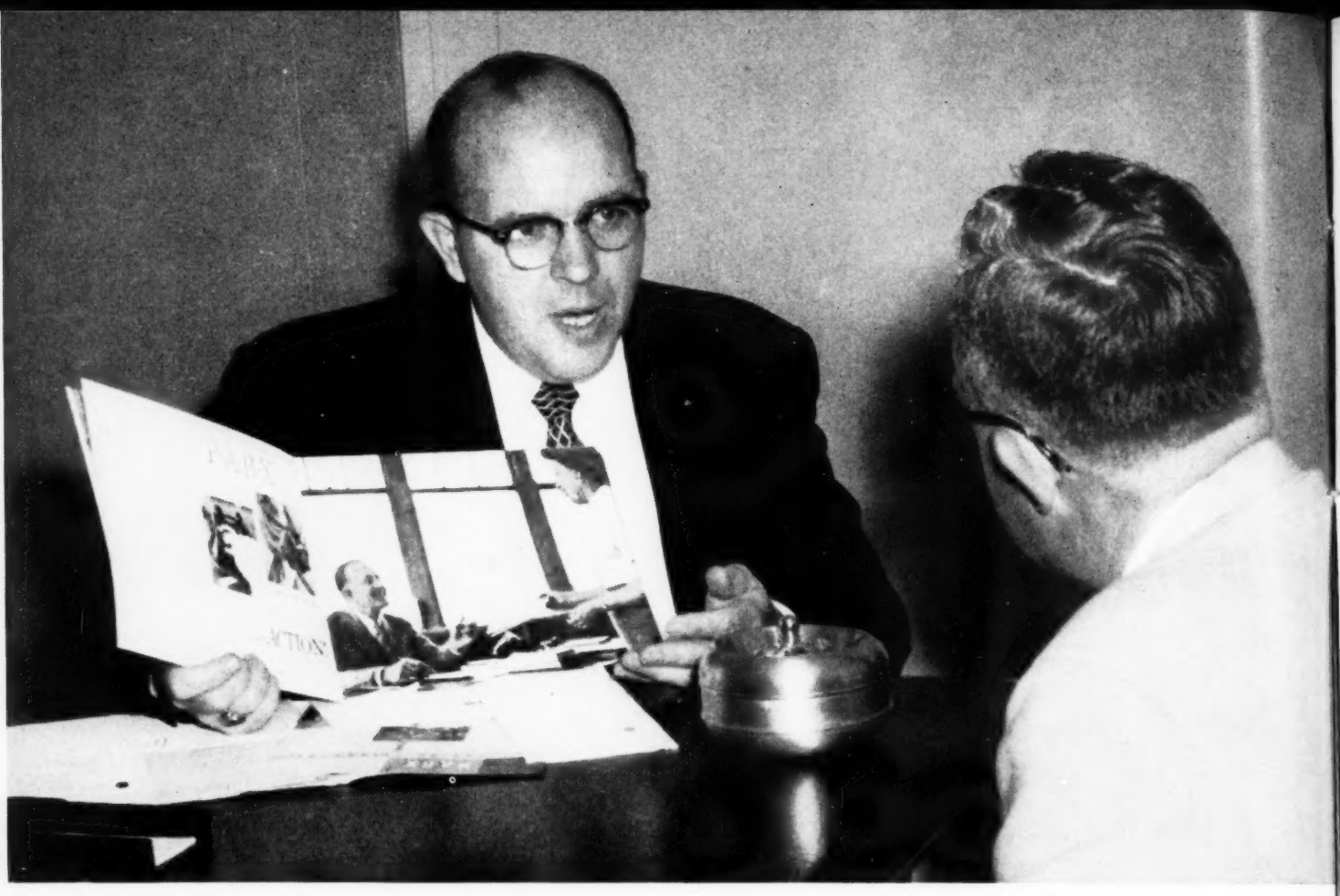
The dial system used is the most modern available and fits into the national dialing network. It uses the 2-5 numbering plan. There are 1,400 lines and 3,200 terminals and it operates on a terminal-per-station basis so that a subscriber's number never changes no matter how often he moves.

All of the conversion work was handled by Iowa Continental employes except the actual installation of the central office equipment. New numbers were assigned well in advance of the change-over date and a new directory was printed. Although the new system has cut the number of operators needed by about half, Iowa Continental is able to use all its former operators in other jobs.

Work on the new building for Iowa Continental began on Apr. 1, 1955, while the building site was purchased

(Please turn to page 43)

These photos were taken by the author as part of his assignment. Left: New central office building of the Iowa Continental Telephone Co. at Grinnell. Right: D. A. Barnes (left) controller and J. L. Van Horn, president look over the new automatic equipment installed at Grinnell.



Messrs. Arthington and Schweitzer of the Illinois Telephone Company demonstrate how they use Automatic's promotional material to sell P-A-B-X.

They're doing a great job Selling P-A-B-X's!

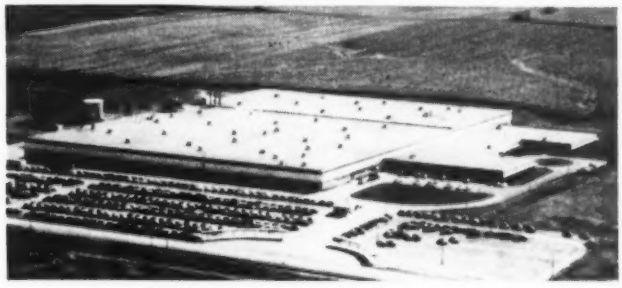
"We call our representatives 'commercial engineers'. We establish the telephone company in the prospect's mind as an organization of communications experts."

G. R. Arthington
Commercial Supervisor
Illinois Telephone Company

"We anticipate needs—we show the subscriber we are interested in his problems. It's good public relations."

B. C. Schweitzer
General Commercial Manager
Illinois Telephone Company

A few of the many recent P-A-B-X sales made by the Illinois Telephone Company:

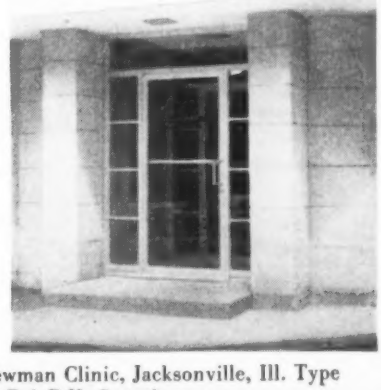


General Electric plant, Bloomington, Ill. Type 75 P-A-B-X; 250 stations.

Illinois School for the Deaf, Jacksonville, Ill. Type 50 P-A-B-X; 65 stations.

Farmers' State Bank, Jacksonville, Ill. Type 33A6A P-A-B-X; 12 stations.

Morgan County Farm Bureau, Jacksonville, Ill. Type 95 P-A-B-X; 10 stations.



Newman Clinic, Jacksonville, Ill. Type 85 P-A-B-X; 9 stations.

The sales-minded Illinois Telephone Company is showing what a really aggressive P-A-B-X sales program can do. It's jumped its monthly P-A-B-X billing 28%.

Sales Training Came First

"Eighteen months ago," says Mr. B. C. Schweitzer, General Commercial Manager of the Illinois Telephone Company, "we began by talking to telephone companies that were already promoting P-A-B-X. Then we brought our salesmen in for two 2-day training sessions. We told them what each P-A-B-X does, how it operates, what the customer expects from it.

Automatic's P-A-B-X Promotion Kit Helps

"We developed our own program and gave each salesman a binder with folders and sales data from Automatic's P-A-B-X Promotion Kit. One man in each district was assigned to P-A-B-X promotion.

Initial Approach Made to Top Management

"We watch for new plants and additions. Then we call a top management man for an appointment. On our first visit, we ask him to tell his department heads that we will make a survey. This gives department heads due importance, overcomes resistance, insures cooperation. We record all calls on a form we designed ourselves.

Next, a Survey

"We make no recommendations until we have thoroughly analyzed the prospect's needs. We start by talking to the switchboard operator. She knows more about the company's communications problems and equipment needs than anyone. Of course, we ask her to make a peg count of incoming and outgoing trunk calls and intercom calls. We find out why each station is located where it is. Often we show the prospect where relocation could save steps.

Then, the Proposal and Follow-thru

"After we figure the number of lines, extensions, and bells, and consult with our plant departments, we submit our proposal. When the contract is signed, we mention our full list of services and equipment for future requirements. After installation, we check periodically to make sure our equipment meets changing needs."

AUTOMATIC'S BIG P-A-B-X PROMOTION KIT can help *you* build P-A-B-X business, just as it has helped these men. Write for it today. *Address: Automatic Electric Sales Corporation, 1033 W. Van Buren St., Chicago 7. Or call HAymarket 1-4300.*

AUTOMATIC ELECTRIC

ORIGINATORS OF THE DIAL TELEPHONE

Courts and Commissions

Minn. Independent Receives Increased Rate Schedule

The Minnesota Railroad & Warehouse Commission on July 30 authorized the Mankato Citizens Telephone Co. to increase rates.

The company, serving 12,872 local and 2,091 rural stations, was granted rates which would raise operating revenues from $787,883 to $885,257 and net income from $171,929 to $209,559, a new rate of return of 5.94 per cent on a plant the fair value of which is $3,529,200. The Mankato and North Mankato rates as authorized are:

	Old	*New*
Business:		
One-party	$7.75	$9.00
Two-party	7.00	7.80
Four-party	6.00	6.75
Rural ten-party	4.00*	4.85*
Residence:		
One-party	3.75	4.50
Two-party	3.25	3.85
Four-party	2.75	3.25
Rural ten-party	3.50*	3.85*
Rural multi-party	3.00	—

*An additional charge of 25 cents per month for a desk-handset instrument.

Comparable rates for one-party business service at Mapleton are: $6.00 raised to $6.85. Those at Good Thunder, Madison Lake, Eagle Lake, St. Clair, Garden City and Pemberton are: $5.50 raised to $6.00.

Illinois Suit Asks Lower Long Distance Rates

A suit declaring that telephone companies are over-charging subscribers by 15 per cent on long distance calls, and demanding wholesale refunds has been filed in U. S. District Court in Chicago, it was reported on July 27.

The bill, prepared by Attorney Harry R. Booth, names as defendants the American Telephone & Telegraph Co., the Illinois Bell Telephone Co., and the Southwestern Bell Telephone Co. It was filed in the name of Milton Booth, a brother of the lawyer, and doing business at the Booth Co., furniture jobbers.

Attorney Booth said the suit is filed under a specification in the Federal Communications Act which provides that any person damaged by any violation of the FCC law may go direct to federal court.

Booth declared that the AT&T is earning over 8 per cent on long-distance calls which, he charges, "makes rates excessive and unlawful, and the plaintiff is damaged thereby."

He asks that the rates be reduced by 15 per cent, and asks a court order for a refund of all "excessive charges" since Oct. 1, 1953. It was on that date that AT&T secured an increase of rates and, Booth alleges, represented it would make their earnings no more than 6 to 6½ per cent. Booth formerly served as an attorney for both the Illinois Commerce Commission and the FCC.

The suit was assigned to Federal Judge William J. Campbell.

OKs $51,870 Rate Increase For Florida Company

The Florida Railroad & Public Utilities Commission on July 27 authorized the Winter Park Telephone Co.:

(1) To institute extended scope service between its exchanges and the Orlando exchange of Southern Bell Telephone & Telegraph Co.

(2) To consolidate its present exchanges at Altamonte and Casselberry with a new centrally located exchange in Altamonte.

(3) To establish the new base rate areas provided in its application for the Altamonte and Winter Park exchanges upon approval by the commission of a new tariff of rates and charges, which will produce $51,870 additional revenue.

The commission ordered the company to submit for its approval a proposed tariff showing in detail the rates and charges which it proposes in order to accomplish the increase in revenue.

Illinois Bell Petitions To Buy Two Independents

Hearings were completed before the Illinois Commerce Commission on July 26 on the petition of Illinois Bell Telephone Co. to buy and operate the Columbus and Burton Telephone Cos.

Illinois Bell said it proposes to change both from magneto to automatic operation.

The petitions, filed in June, ask approval of sales contracts with the Columbus Telephone Exchange and the Burton Mutual Telephone Co., both subscriber-owned, mutually operated exchanges.

The petitions also ask that rates comparable to those in similar Illinois Bell exchanges be put into effect when the company can begin operations.

Indiana Company Enters Plea for Rate Raise

A petition for an increase in rates was filed on July 17 by Indiana Telephone Corp., Seymour, with the Indiana Public Service Commission.

The company serves more than 34,000 telephones through its 43 exchanges in 13 counties in Southern Indiana.

E. S. Welch, operating vice president of Indiana Telephone pointed out that as a result of rapidly mounting expenses and the increased cost of telephone equipment, the company's rate of earnings is at the lowest point in several years which is clearly below yielding a fair rate of return.

SW States Gains Rate Raise At Canton, Tex. Exchange

Rate increases for the Canton, Tex. exchange of the Southwestern States Telephone Co., Brownwood, have been approved by the Canton city council, it was reported on July 14.

Increased annual revenue of $4,407.60 and a 5.99 per cent return on the company's Canton investment, is expected from the following rate raises:

	Old	*New*
One-party business	$4.50	$5.65
One-party residence	3.25	4.00
Two-party residence	2.50	3.15
Four-party residence	2.00	2.50

Indiana Co-op Petitions For Rate Increase

The Mulberry Co-Operative Telephone company has petitioned the Indiana Public Service Commission to grant it a rate increase which would enable the company to meet its higher costs and enable it to earn a fair return, it was reported on July 12.

The higher rates are being sought by the company as a result of the increase in the federal minimum wage.

The company serves 930 subscribers.

Minn. Commission Approves Rates for Four Companies

The Minnesota Railroad & Warehouse Commission on July 30 approved rate increases for four telephone companies, as follows:

	Pineland Telephone Co.†	Northland Telephone Exchange	Pioneer Telephone Co. of Waseca County	Brownsville, Dakota, Granger and La Crescent exchanges of Fillmore County Telephone Cooperative	Fillmore County co-op interim rates
Operating Revenues:					
(1) Before	$ 20,247	$11,970	$ 54,208	$ 141,801	——
(2) After	22,450	13,895	58,331†	190,138†	$144,388
Net Income:					
(1) Before	$5,150	$ 306*	$ 12,370	$ 25,179	——
(2) After	5,387	1,509	17,897	49,360	$ 26,714
Rate base	$103,637	$34,798	$299,000	$1,233,831	$919,702
Ratio of Net Income to rate base.....	5.20%	4.34%	5.98%	4.0%	2.9%
Stations:					
(1) Urban	139	159	359	not given	not given
(2) Rural	313	85	395		
(3) Switched ..	—	35	—		

*Deficit
†Dial Service

Ohio Independent Requests Permission to Buy

The Northern Ohio Telephone Co., Bellevue, applied to the Ohio Public Utilities Commission recently for permission to buy the Clarksfield Telephone Co.

Northern Ohio said it would buy the option held by New London, O. Attorney G. C. Ford.

Three Iowa Companies Vote For Consolidation

Officers and stockholders of the Long Grove (Iowa) Mutual Telephone Association, Eldridge (Iowa) Mutual Telephone Co., and McCausland telephone company voted on July 19 to consolidate the three companies and modernize the facilities of the combined companies.

All three companies have a total of some 880 subscribers.

Charles Lousseart is president of the Long Grove Telephone Co., Grover Rohlk of the Eldridge company and Leslie Stevens of the McCausland Telephone Co.

Wis. Company Requests Raise

The Wisconsin Public Service Commission on Aug. 10 was to hear the application of the Community Telephone Co. for authority to increase rates.

Minn. Commission Oks Sale

The Minnesota Railroad & Warehouse Commission on July 30 authorized Mrs. Gertrude Fernbaugh to sell the Eden Valley Telephone Co. to L. H. Arvig.

36-Circuit Cable Proposed Between Hawaii, California

Stockholders of Hawaiian Telephone Co. will be asked to approve a 15 per cent financial participation with American Telephone & Telegraph Co. in a proposed 36-million-dollar telephone cable between Hawaii and California, according to J. B. Atherton, Hawaiian company president. An investment of 5 million dollars is contemplated by Hawaiian.

Directors of the company will be asked at an Aug. 16 meeting for approval to proceed with arrangements to finance the venture. A debenture issue, which would be submitted to the Hawaiian Public Utilities Commission for approval, is expected for that purpose.

The Federal Communications Commission also must approve the undertaking, which would provide a new cable with 36 circuits compared with 14 radio-telephone circuits now in operation between Hawaii and the Mainland. The company expects the cable to be in operation by January, 1958.

Teletypewriter to Save Huge Sum for N. Y. Central

New York Central will save one million dollars a year because of a new teletypewriter system just developed. This system—designed by Bell Laboratories, engineered by Long Lines, and installed by Western Electric—is maintained by Ohio Bell Telephone Co.

The purpose of the 81D1 system is to contact the terminal of the incoming train, and forward operation details. At the same time it keeps a running record of all box cars on sidings.

Completely automatic, the system requires only one person to place the perforated tape in the transmitter, and another to tear it out after the code has reached its destination.

Cleveland, an automatic switching center, picks up messages from New York—the only other state in operation now. Detroit and Indianapolis will be added to the system within the next few months.

Urges Appreciation of American System

Dr. Robert Wilson, chairman of the board of Standard Oil of Indiana, was the commencement speaker at Hastings College graduation ceremonies. His young listeners heard some wise and important words, observes the *Industrial News Review.*

He made it clear that he does not share the belief, "too common among businessmen today, that our colleges and universities are hotbeds of communism or socialism."

But he did express concern that "our students are too much inclined to take for granted the wonderful advantages they enjoy," and that "so few seem to emerge with real enthusiasm for the American way of life and its amazing achievements."

This is "especially disturbing at a time when the Communists seem to have found a way to distort the truth and propagandize whole generations of their youth into apparently enthusiastic support for dictatorships which enslave the individual, glorify brute force, decry individualism and deny existence of a Supreme Being."

Then he came to the heart of the matter:

"We must do more at all levels of education to better understand what we have, how we got it and what we must do to preserve it. And we must make sure that our schools build ideals as they build knowledge.

"There is nothing more dangerous in the world today than high intelligence coupled with low ideals."

This coupling has brought on a series of the most destructive wars in history. It has led to the enslavement of entire peoples. It has made, in much of the world, a grim jest of the "dignity of man" concept on which Christian civilization and individual freedom alike rest. Dr. Wilson's warning could not be more timely, concludes the *Review.*

Stresses Human Relations

"We must work in the field of science, yes, but more, we must work in the field of man—and here lies the greatest field of all . . . this is the real opportunity that lies ahead of us all."—ROBERT E. GROSS, *president, Lockheed Aircraft Corp.*

XUM

Safety Council to Launch Campaign Against Falls

Accidental falls—surpassed only by motor vehicle accidents as a killer—is the target of a nationwide campaign to be launched on Sept. 1 by the National Safety Council.

Last year 19,800 persons in the United States were killed by falls—a rate of 55 fatalities per day. In the nation's industrial operations alone, more than 450,000 workers are temporarily or permanently disabled annually by falls.

"Our goal in this campaign—and I know it is an ambitious one—is a 50 per cent reduction in injuries and deaths due to falls," said Ned H. Dearborn, president of the council. "We feel that by focusing special effort on this single accident target, we will be able to arouse management and worker to drastically cut those unsafe attitudes and conditions that lead to falls."

Beginning Sept. 1, and continuing to Aug. 31, 1957, the campaign will be an across-the-board operation, hitting at accidental falls wherever they may occur in industry, in the home, in public places—wherever there are people.

Falls were singled out for special emphasis not only because of their numerical importance, but because they can be prevented by voluntary individual behavior more effectively than other accidents. A little extra caution and knowledge on the part of each person can do much toward the reduction of falls.

The occupational phase of the campaign will be on an organized basis with registration, record keeping and awards. Any company or governmental agency is eligible to participate in the falls campaign. Enrollment may be on the official registration form provided on request from the council or simply by letter. Operations at different locations employing 25 or more workers should be registered separately.

To assist participants in carrying on an effective campaign, the council will make available a series of 13 posters and three large banners. Films, flip charts, illustrated booklets, five-minute safety talks and safety instruction cards on falls also may be obtained.

Each participating concern will be sent a suggested campaign plan for scheduling and using the materials and incorporating them into its safety program.

A "Certificate of Achievement" will be awarded to each plant achieving the goal of a 50 per cent reduction in falls or having no chargeable injuries from falls during the campaign year. Companies enrolling in the campaign must provide injury experience from falls covering 1955 and 1956 to the nearest convenient date. A special feature of the campaign will be a "Certificate of Commendation" to supervisors who attain the campaign goal.

For a copy of the booklet, "Falls Aren't Funny" and a brochure listing the campaign materials available, write the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Pictured above is the artist's conception of the sub-exchange office to be erected by General Telephone Co. of Kentucky to serve south Lexington. H. J. Huether Jr., company president, announced that ground was broken on June 28 for the new sub-office, which is expected to be in service by mid-1957. The estimated initial cost of the project is $811,932, including construction of the new building, automatic switching equipment, providing a new conduit system, placing new cables and rearranging present facilities. The initial installation will provide 3,400 lines of switching equipment and 4,500 terminals. The building is designed for additional equipment and equipment is engineered to provide for expansion.

The James D. Snider family receiving the 6000th telephone of the Lexington (Va.) Telephone Co. From left to right: Charles W. Gunn Jr., commercial manager; John Quist, wire chief; Reid Falls, installer; John, Glen and James D. Jr., and Mr. & Mrs. Snider. When the present management took over in 1951, there were 4297 telephones in the company's Buena Vista, Natural Bridge and Lexington exchanges. This year a separate automatic exchange will be established at Glasgow (now being served from the Natural Bridge exchange) and the Lexington exchange will be cut over to furnish dial service. The company also acquired the Brownsburg Telephone Co. which is scheduled to be converted to automatic operation during the year 1957.

IN THE NATION'S CAPITAL

Concluded from page 18

dependents, American Motor Company (Nash-Hudson) and Studebaker-Packard are hard put to survive. Kaiser, another independent, has already gone by the board.

If this were simply a question of survival of the fittest, or the toll of competition in the making of a superior product, there could be no argument about letting the economic law of supply and demand take its own course. But it is not as simple as that. Nobody denies that the independents make good automobiles, equal in their class to the products of their competitors. The trouble is that some of the so-called consumer "demand" for big three products may be artificially inspired and even stimulated by government orders.

The big three, with superior resources for advertisement, sales, and dealer organizations, etc., have built up such a back-log of popular acceptance that it is conceivable they might even be able, for a while, to sell *inferior* products, in competition with the independents. The average automobile buyer doesn't want to "take a chance" on lower resale value, or possible discontinuance of production, etc. On top of that he sees virtually all federal government services—Army, Navy, Postoffice, etc.—almost exclusively patronizing big three products. So he says to himself, "They must be pretty good or the government would not be buying them."

The grave question posed to the federal government is this: Will this nation's economy be better off, in the long run, by having three major automotive groups or five? Secretary of Treasury Humphries evidently feels very much concern over this, considering the steps he has taken to assist Studebaker-Packard during its recent financial difficulties. But if the final decision *is* to assist the independents, the federal government could go further along this line. It could order the Army, Navy, Postoffice to spread some of its business to the independents. Some of our top government officials consider a Cadillac (superb car that it is) to be almost an insignia of their office, and would feel slighted and put upon if they had to settle for less. But an administrative order could fix that fast.

It is not clear in the telephone field just how any such "help the independent" movement could be applied. But there is certainly food for thought, even in this field. Telephone service is where you find it. And government agencies operating in Independent telephone service areas are generally most cooperative about patronizing the local services. But there are other ways, such as in the allotment of contracts for supplies and equipment, where the matter of throwing a fair share to the Independents would be a most practical way of keeping them alive and healthy, economically speaking.

FCC Boss Expects TV Row

Strong reaction to the recent Federal Communications Commission proposal to shift all or most of the nation's television operations to Ultra High Frequency (UHF) is predicted by George C. McConnaughey, FCC chairman. However, said McConnaughey, the move may be necessary to provide a competitive, nationwide television system.

As it stands now, most of the investment of the TV industry and viewers alike is in VHF stations and receivers —channels numbered two through 13. Out of 37 million TV sets in operation, for instance, just 7 million will receive UHF channels — numbered 14 through 83.

McConnaughey said:

"The commission put the proposal out for the comments of the industry. These comments will begin coming in Sept. 10 and we expect plenty of opposition and plenty of support.

The FCC chairman stressed that the commission has made no decisions on the plan but is merely considering it and asking for comment. And he explained that if the shift is decided upon, it would be over a period of at least five years and possibly eight years. An actual shortage of places for stations on VHF is behind the latest FCC proposal. The FCC boss added:

"As it stands now, VHF has a capacity of 500 stations and is just about filled. UHF has a capacity of about 1,800 stations and has only 110.

McConnaughey said there are developments in the process of being completed by many of the major TV manufacturers to make UHF antennas and receivers more efficient.

"And the fact remains that we cannot achieve a nationwide competitive TV system with VHF—already nearly filled to capacity," he said.

The chairman was recently in San Francisco to attend a convention of the National Association of Railroad and Utilities Commissioners (NARUC), of which he is a past president.

It is an interesting fact that there may well be more television sets in American homes than there are telephones! The total number of "households" in the United States was 47,610,000 as of last March (and probably near 48,000,000 by the present time). In these household establishments there were 34,842,000 telephones (by now well over 35,000,000). This makes 73.2 of all American homes with telephone service.

But the television industry figures show that four out of five (or 80 per cent) of all American homes have television sets. Clearly some margin for new business on the telephone front.

Telephone Teamwork Rescues Woman in Distress

Telephones are used by many people —the happy, the lonely, the sad.

Most important of all, they are used in an emergency by someone alone and in need of help. Telephone people, who constantly rise to every emergency, answer such calls quickly, efficiently and warm-heartedly.

Many lives have been saved because a traffic operator or plant man has pitched in to perform a personal service which is growing to be a tradition in every community.

Six employes from Lancaster, O., and Canal Winchester, O., recently combined their efforts to trace just such a call.

Rose Marie Kern, operator in the Lancaster office, heard just one word on a call she answered from Canal Winchester: "Help."

She called Service Assistant Alice Doss. Alice reported the call to Dan Moore, Lancaster wire chief, and Mary Donahue helped Alice monitor the connection.

Dan, in turn, called Raymond England, repair foreman, and Ray called Raymond Basing, combination man, who lives in Canal Winchester.

Basing traced the call in that office and found it was a rural line with 8 parties. At the same time, he called the emergency squad and asked that the squad follow him on his search. At the fourth home he checked he found the occupant, Mrs. Margaret Zaayer, on the floor, her telephone by her head.

The emergency squad rushed her to the hospital—half an hour from the time the call was originally received by Rose Marie.

Freedom Under Government

"It is certain that the most natural and human government is that of consent, for that binds freely . . . when men hold their liberty by true obedience to rules of their own making."—WILLIAM PENN *(Essay towards the Present and Future Peace of Europe, 1693)*

TROUBLE CLEARING-Sine Wave Form

Concluded from page 20

and vertical. Suppose a balloon is released and ascends to a height of 1 mile. While ascending it drifts east with the wind, two miles. We say that it ascended 1 mile and covered a ground distance of 2 miles. However, its actual path is a curve and is somewhat shorter than 3 miles.

Now, let us refer back to *Fig. 1.* Suppose that a balloon is released at 0° (right side) and that its path is such that it follows the curve of the circle to 90°.

The two components of its motion are a vertical distance of 1 (radius R") and a horizontal distance of 1 (radius R).

While it completes both of these components in the same time, its motion is not uniform. Its ascent is at first rapid, then slower and slower as it approaches 90°. Its movement to the left starts out very slowly, then it gradually speeds up to make up for lost time.

There are mechanical and electrical devices which convert circular motion into its two straight line components. *Fig. 3* shows a very common mechanical device for this purpose. The wheel revolves at a uniform speed, therefore, the pin P has a uniform circular motion.

One end of the rod R is hinged to the pin and the other end is hinged to the piston of a pump. It may readily be seen that the vertical component of the circular motion of P drives the piston up and down in the cylinder while the horizontal component merely swings the rod back and forth and performs no useful work.

A thoughtless person might conclude that since the wheel revolves at a constant speed the piston also would travel at constant speed throughout its stroke. However, what we have learned about sines tells us that, in the position shown in the drawing, the piston is moving upward at its maximum speed. It will move slower and slower as it approaches the top of its stroke, stop for an instant, then start slowly downward, but increasing its speed until it again reaches maximum at mid-stroke.

It should be noted that this device converts continuous, one direction, rotary motion to straight line reciprocating (alternating) motion and, hence, may be compared to an ac generator which converts the rotary movement of its armature to alternating current.

In *Fig. 4.* the circle represents the circular path of the armature of a simple form of ac generator such as a magneto hand generator. Dots have been placed on the circle at 15° intervals. Magnetic "lines of force" extend between the N and S poles of the field magnet.

When the armature is in a vertical position, hence passing 90° and 270°, it is cutting all of these lines of force at right angles and is, therefore, generating its maximum voltage. When it is passing 180° and 0°, it is moving parallel to the lines of force and cutting none of them, hence, the voltage is zero.

When the armature again reaches 90° and 270°, it is in a reversed position, hence, the voltage it generates is in the opposite or negative direction. At intermediate points the voltage produced is in proportion to the sine of the angle through which it is passing.

To the right of the circle we have constructed the sine wave that the generator is producing. From each dot on the circle a dashed line extends to the right until it meets that same degree or degrees on the time line, thus: On a dashed line starting from 180° and 0° on the circle, we have spotted zero voltage at 0°, 180°, and 360° on the time line. On a dashed line starting at 10° and 170°, we have spotted the voltage at 10° and 170° on the time line. We continue in this manner to 90°. The line from 90° on the circle extends to 90° on the growing sine curve.

This completes the first or upper half of the cycle as we have spotted both the upward and downward slopes at the same time. The second or lower half of the cycle is completed in the same manner. The sines of the angles between 180° and 360° are negative, therefore, the curve which they form is below the zero line and the voltage produced is negative.

As before, we finish by sketching in a curved line from dot to dot. Notice that in this exercise we have constructed a sine wave without the use of a table of sines and without reference to the numerical value of the sines.

Now what have we accomplished by this discussion? If the reader was not already familiar with this subject we hope that he is now thoroughly familiar with the shape of the sine wave, how it is constructed on paper, and how it is produced by mechanical or electrical means.

He should keep in mind, however, that the waves which we have constructed on paper are *ideal.* They are pure sine waves without irregularities or harmonics.

The actual alternating current may be quite different. It usually includes some of the harmonics and these may come and go. The current may vary in frequency and volume. How can the actual current or voltage be examined and studied?

There are two instruments which may be used for this purpose. The oscillograph makes a permanent tracing of the wave as long as the instrument is connected to the circuit. The oscilloscope produces on a screen, much like a TV screen, a *moving picture* of one or a few cycles. Changes or irregularities in the wave form of the current appear on the screen just as they occur.

We will have more to say about these instruments in a future article.

Fire Insurance Special Coverage Endorsement, Told

The United States Independent Telephone Association member letter dated July 27 reported the progress of a special task force appointed by USITA to explore the possibility of obtaining as a part of standard fire insurance policies, an endorsement covering damage to telephone equipment from electrical current.

The USITA letter explained that present standard fire insurance policies carry a so-called "electrical apparatus clause," which exempts the insurance company from liability for damage to telephone equipment caused by electrical currents *unless fire ensues.* The bulletin continues:

"Recently the Insurance Co. of North America and the Philadelphia Fire & Marine Insurance Co., 1600 Arch St., Philadelphia, Pa., have made available an endorsement to their fire policies, to extend coverage to include damage by electrical current.

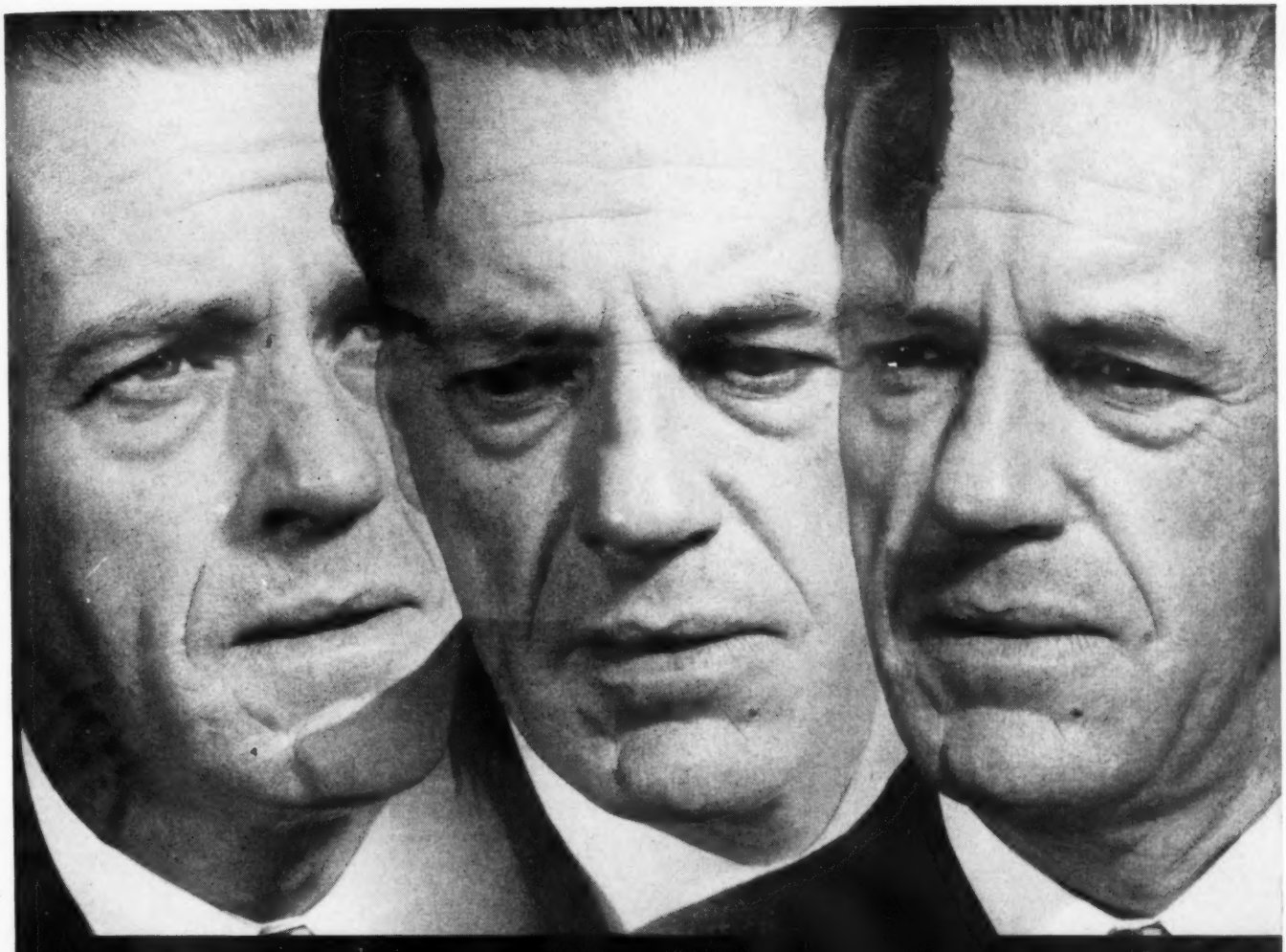
"This extended coverage also covers losses through collapse of a building, damage by water from within heating and plumbing systems, water admitted through faulty roofs and doors, and a number of other risks.

"The endorsement has been approved by the state insurance departments of 33 states and is under consideration by a number of other states.

"The policy carries a $250 deductible clause, and the rates per $100 of insurance are 5 cents for one year, 12½ cents for three years, and 20 cents for five years when the policy to which the endorsement is attached contains the 80 per cent or higher co-insurance clause.

"These rates for the special endorsement are in addition to the applicable fire and extended coverage endorsement rates.

"It is suggested that any company interested in this special coverage endorsement, contact an agent of the Insurance Co. of North America and the Philadelphia Fire & Marine Insurance Co., for a copy of the endorsement and further details concerning this matter."



Tired of Worrying about Noisy Circuits?

Quiet Them with LENKURT COMPANDORS!

It's discouraging (and costly) to operate with noisy circuits. But there is a way you can put your mind at ease. By installing Lenkurt Compandors at terminals, you can often boost persistently noisy circuits to toll quality *in a single step*. Signal-to-noise ratio can be improved up to 22 db, or more!

YOU GET "NEW" CIRCUITS WITHOUT RETRANSPOSING. If you have crosstalk between carrier telephone systems that are super-imposed on lines transposed for a lower frequency, Compandors can reduce it greatly. This means you can often use carrier systems like Lenkurt Type 33A on lines transposed for voice frequencies. Or you can install systems like Lenkurt Type 45A on lines transposed for low-frequency carrier systems.

YOU CAN MAKE REAL SAVINGS. Your organization can improve noisy carrier and radio circuits quickly, and at a nominal cost per circuit, with Lenkurt Compandors. You'll want to take advantage of this saving. Write for details in Bulletin 5090-B P4. Automatic Electric Sales Corporation, 1033 West Van Buren Street, (HAymarket 1-4300), Chicago 7, Illinois. In Canada: Automatic Electric Sales (Canada) Ltd., Toronto. *Offices in principal cities.*

AUTOMATIC ELECTRIC

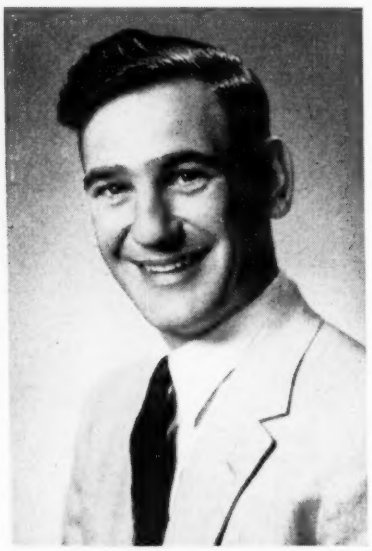
Originators of the dial telephone • Pioneers in automatic control

GENERAL SYSTEM INDEPENDENT

Elyria, O., Company Names Commercial Representative

Ronald Taylor, who received early training in his native England, before going to Elyria, O., in 1953, has been appointed commercial representative of The Elyria Telephone Co.

The position is a new one and was created to enable the company to have



RONALD TAYLOR

closer contact with industrial and business users of telephone service so that their needs may be more adequately met in a fast growing city.

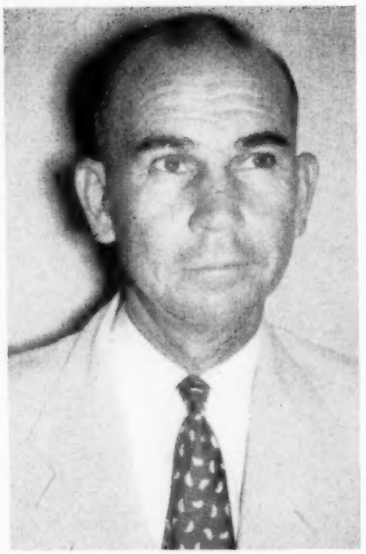
Mr. Taylor was born in London on June 29, 1926. On leaving school, he joined the telephone division of the British post office and served in a variety of positions. At the same time he took courses in communication in Kingston Technical College. Enlisting in the Royal Air Force in World War II he was attached to the American Eighth Air Corps, serving two and one half years at General Eisenhower's supreme headquarters on communications.

On arrival in Elyria, he worked two years as a combinationman, then was transferred to PBX installation and repair.

Frank Freeland Accepts Executive Post in Guam

After a year and a half in the Caroline Islands as Administrative Officer for the Trust Territory of the Pacific Islands, Frank Freeland, a former Independent telephone man associated with California Interstate Telephone Co., has now accepted a position as Chief Officer, Utilities Agency, for the Government of Guam in the Marianas Islands.

Along with other administrative responsibilities, his duties in the Caroline Islands included supervision of radio station and local exchange operations in the Trust Territory, but his



FRANK FREELAND

new position puts him back in utilities work on a full-time basis.

The Guam Utilities Agency includes electric system, water system and telephone system, which on Guam are all interconnected between military establishments and all civilian communities.

Mr. Freeland has had experience in various utilities, including the Southern California Edison Co., the Los Angeles Department of Water & Power, the Los Angeles Metropolitan Water District, the California Electric Power Co., then California Interstate.

Rate engineering work took Mr. Freeland to the Hawaiian Telephone Co. in 1947, where he advanced to assistant treasurer and then to director of the budget. For several months in 1954, he did consulting work in "The States" before going to his administrative position in the Trust Territory.

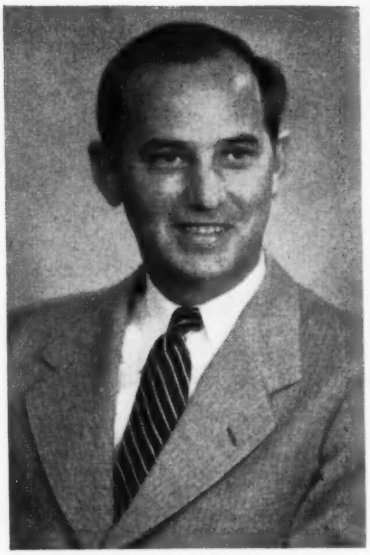
Mr. Freeland states that much construction remains to be completed in the development program for his three utility systems, and that the telephone division alone may require upwards of 2 million dollars for additions and improvements in the next two years.

General Announces New Executive Appointments

Roger L. Lyons, chief engineer for General Telephone Co. of Kentucky, Lexington, became general plant manager for General Telephone Co. of Indiana, Inc., on Aug. 1, according to an announcement by L. H. Meyer, of Lafayette, president of General of Indiana.

Mr. Lyons will replace Paul N. Malmgren who has been named director of plant for General Telephone Service Corp., New York City. Mr. Malmgren will assume his duties in the New York office on Aug. 1.

Mr. Lyons, a graduate in electrical



R. L. LYONS

engineering from the University of Kentucky in 1941, began his telephone career in 1939 as draftsman and assistant engineer for General Telephone of Kentucky. He has served as commercial manager for that company as well

P. N. MALMGREN

as facility engineer, division engineer, plant supervisor, and division manager between 1941 and 1954 when he became chief engineer for the Kentucky company.

Lyons served in the Army Signal Corps for four and one-half years during World War II and is a lieutenant-colonel in the Signal Corps Reserve. He is a graduate of the Command and General Staff College and Utility Executive Course, University of Michigan, and is president of the Lexington chapter of the Armed Forces Communications and Electronic Association, as well as president of the Blue Grass chapter of the Kentucky Society of Professional Engineers.

Malmgren has been general plant

(Please turn to page 40)

NO. 121 CORDLESS SWITCHBOARD: Striking walnut veneer cabinet and eye-resting suntan keyboard win ready approval of subscribers.

MODERN SERVICE, too: Capacity: 5 trunks, 16 extensions, 5 connecting circuits. "Instantaneous busy" feature prevents interference with toll calls. Common talking circuit on lines, individual line relays (to prevent line leakage), and indicating lamps make operation easy.

Servicing is easy, too. Just drop down the hinged key panel and lift off the rest of the cabinet as a unit.

(Color telephone also by Stromberg-Carlson; available in 8 colors.)

Want more PBX business in the next 30 days?

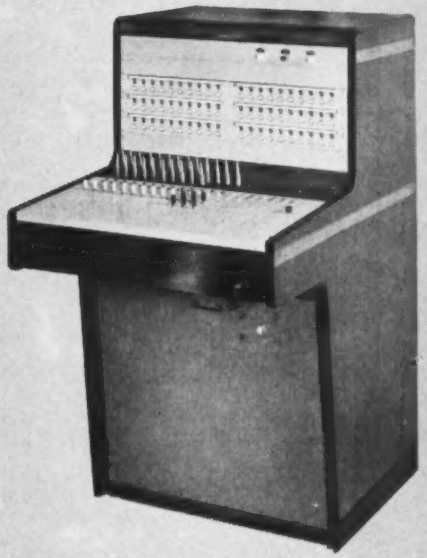
Let America's most beautiful switchboards help you!

Styled in exquisite taste, finished in warm walnut veneers that blend beautifully into any office setting, these Stromberg-Carlson boards speak hospitality.

The artistry of their cabinets is matched by the dependable service they provide, and their popularity is already helping hundreds of independent telephone companies to increase their revenue.

Use them as a "wedge" to open up new PBX business—today, tomorrow, for the next 30 days. See how much excitement they arouse among subscribers!

Call or write your Stromberg-Carlson representative for data and sales literature which will help you solicit new revenue.



NO. 120 SWITCHBOARD: Warm, rich veneers and matching suntan panel fit well into any office surroundings.

CAPACITY: 80 extensions, and either 15 jack-ended trunks and 15 cord circuits, or 10 plug-ended trunks and 10 cord circuits.

FEATURES include trunk re-ring on jack-ended boards, (trunk lines immediately freed, even though operator delays pulling down cord), conference calls, and keys for ringing, ring-back, listening and dialing, through dialing and night connection. Instantaneous busy on plug-ended boards.

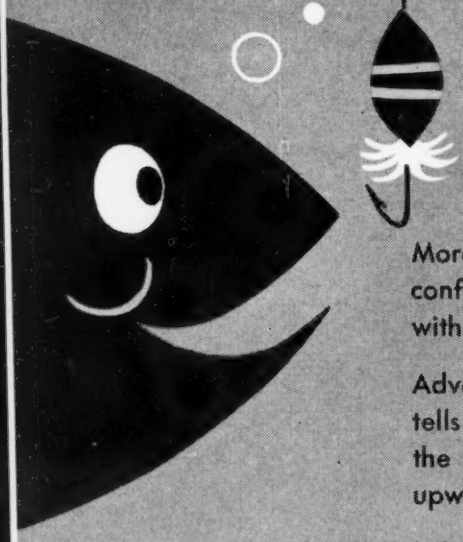
TO SERVICE, you just lift out the rear panel and swing out the relay gate.

STROMBERG-CARLSON COMPANY

A DIVISION OF GENERAL DYNAMICS CORPORATION

Sales Offices: Atlanta 3, Chicago 6, Kansas City 8, Rochester 3, San Francisco 3.

WHY FISH FOR RESERVATIONS?



More and more vacationers are using Long Distance to make and confirm those all-important holiday reservations, and keep in touch with home and office while away.

Advertising aimed at vacation-minded readers of national magazines tells of the value of Long Distance to travelers. The advertisement across the page will run in full color in August magazines that reach upwards of 50,000,000 people.

It is part of a continuing promotion of Long Distance usage which benefits *all* of America's telephone companies, because it stimulates calls to and from every part of the country.

XUM

Vacation tip:

Make your plans by telephone

This summer let the telephone help you relax and enjoy a carefree vacation. Wherever you're bound, call ahead for reservations. You'll add peace of mind to every mile of your trip.

Be sure to telephone out-of-town family and friends you plan to visit. That way you know they'll be there.

And while you're away, remember: home and office are as near as the nearest telephone. It's so quick and easy to call. And it costs so little.

BELL TELEPHONE SYSTEM

LONG DISTANCE RATES ARE LOW

Here are some examples:

Washington, D.C., to Mount Pocono, Pa.	**55¢**
Cleveland to Traverse City, Mich.	**75¢**
Phoenix to Laguna Beach, Calif.	**80¢**
New York to Bar Harbor, Maine	**85¢**
St. Louis to Asheville, N.C.	**90¢**

These are the Station-to-Station rates for the first three minutes, after 6 o'clock every night and all day Sunday. They do not include the 10% federal excise tax.

Call by Number. It's Twice as Fast.

manager for the Hoosier company since Dec. 15, 1953. He began his telephone career in 1939 as switchman at the company's Lafayette exchange and served as chief switchman and plant superintendent in Elkhart before being transferred back to Lafayette in 1950 as equipment superintendent.

J. P. Christensen Receives General System Promotion

The promotion of James P. Christensen, building and methods engineer of General Telephone Co. of the Northwest, to the position of chief engineer of General Telephone Co. of Kentucky was announced on July 24 by W. R. Jarmon, president of General of the Northwest.

A native of Idaho Falls, Idaho, Mr. Christensen graduated from the University of Idaho in 1947 with a bachelor of science degree in civil engineering. He joined General Telephone Co. of the Northwest the same years as an assistant engineer in the company's Spokane office.

He was transferred in early 1949 to Moscow, Idaho, where he held the position of division engineer for two years before returning to Spokane as as assistant to the plant superintendent. He advanced through a series of later promotions to the position of building and methods engineer, to which he was named in March 1955.

He is a member of the American Society of Civil Engineers.

Dayton Installer Receives Vail Award for Saving Life

Ralph Snyder, Dayton, O., installer whose prompt first aid saved the life of a seriously injured traffic accident victim, has been awarded the bronze Vail Medal, it was reported on July 17. Accompanying the medal was a check for $100, presented by President John A. Greene of Ohio Bell Telephone Co. at a dinner in Mr. Snyder's honor at the Hotel Biltmore in Dayton.

Last August, the installer was driving his truck to an assignment when he heard brakes screeching. He hurried to the accident scene and saw a man lying in the street. Armed with his first aid kit he stopped the bleeding of the injured man's forearm.

Later, the chief of police commended Mr. Snyder and stated that his prompt action in applying first aid was instrumental in saving the victim's life.

The Vail Medal awards were established in 1920 as a memorial to Theodore N. Vail, former president of the American Telephone & Telegraph Co., to perpetuate his ideals of public service.

Lincoln T&T Appoints Traffic Superintendent

The appointment of Lloyd W. Cleveland as general traffic superintendent of The Lincoln (Neb.) Telephone & Telegraph Co., effective July 31, was announced on July 27 by Merle M. Hale, vice president. Mr. Cleveland

L. W. CLEVELAND

succeeds Lyle P. Young who retires after nearly 50 years of service in the telephone industry, 44 of which have been with LT&T.

After attending the University of Nebraska, Mr. Cleveland joined the company in 1934 as a salesman in the Lincoln business office. In 1939 he went to York as assistant area commercial manager and in 1941 became district clerk at Hastings. He served in the Armed Forces from 1943 to 1946 with the Air Force in northern Africa and the Signal Corps at Fort Monmouth, N. J., where he attained the commission of first lieutenant. Following his return to the company in 1946 he became area commercial manager at York and in 1951 he returned to Lincoln as staff assistant to the general commercial superintendent. He was appointed traffic chief in September 1951.

L. P. YOUNG

Mr. Cleveland is a member of the sub-committee on toll separations of the United States Independent Telephone Association and a member of the Frank H. Woods chapter of the Independent Telephone Pioneer Association. He is a graduate of the Public Utilities Executive School of the University of Michigan.

Mr. Young has devoted his career to the telephone business and is a pioneer in the industry in the true sense of the word. He started as a groundman with the former York County Telephone Co. at York in 1907 and helped build some of the early long distance lines in central Nebraska. He became manager of the Bradshaw Telephone Co. before moving to Grand Island in 1911 as assistant foreman with the Nebraska Telephone Co. He joined LT&T in 1912 as manager at Polk when the Lincoln company purchased the property of the York county company. Later, in 1917, he moved to York as county commercial manager and in 1920 was appointed district traffic chief with headquarters at Beatrice. He became district manager of the eastern district with offices at Nebraska City in 1922 and in 1926 moved to Hastings as district manager of the western district. He was appointed general traffic superintendent in 1949.

For a number of years Mr. Young has been a member of the traffic committee of the United States Independent Telephone Association and is a charter member of the Frank H. Woods chapter of the Independent Telephone Pioneer Association.

Mo. Man Seriously Injured

Lyle W. Barnthouse, district manager of the Missouri Telephone Co. at Macon, Mo., was seriously injured recently in an auto accident while returning from a business trip to Iowa. His right leg was amputated just below the knee, and he also suffered a severe head wound. A 16-year-old son, Bill, who accompanied him, received minor injuries.

Ohio Employes Commended For Help in Accident

Mrs. Patricia Campbell, Lancaster, O., operator, and Mrs. Margaret Griffity, service assistant, have been credited by

(Please turn to page 43)

There is an ALATHON® polyethylene resin for your specific insulating and jacketing need

ALATHON polyethylene resins are outstanding in the field of electrical insulating and jacketing materials. Not only are the properties of ALATHON suited for wire and cable insulation, but a number of compositions have been developed for specific applications. Performance in these specific uses has been improved by basic changes in the molecular structure and by advances in compounding with improved stabilizers and other ingredients.

ALATHON polyethylene resins offer low power loss and dielectric constant, toughness and flexibility even at extremely low temperatures, and high moisture resistance. ALATHON has particularly outstanding thermal and mechanical properties.

ALATHON 4, BK-20 offers exceptional outdoor durability and resistance to environmental stress cracking. It is protected from ultraviolet light by fine channel black, intimately dispersed, and has excellent low-temperature toughness, contributed by the high molecular weight of the composition.

ALATHON 5, NC-10 and ALATHON 5B, NC-10 are unpigmented and offer the best electrical properties. The low power factor and dielectric constant of these resins remain essentially unchanged over the entire range of frequencies measured to date, and over a wide range of temperatures.

ALATHON 5, BN-07 is specially compounded to give a measure of weather resistance without sacrificing low dielectric loss characteristics.

ALATHON 5, BK-21 is protected from ultraviolet light by fine channel black. It has unusually good loss characteristics for material containing carbon.

ALATHON 5, BK-22 is like ALATHON 5, BK-21, but contains more carbon black which gives greater weather resistance.

ALATHON 6, NC-10 is a foamable polyethylene composition that forms a cellular wire coating with fine, discrete pores. Because of the presence of the inert gas, the dielectric constant is even lower than that of solid polyethylene.

Du Pont has prepared property and application data that will help you choose the composition of ALATHON which will work best in your specific application. To get this complete information, simply clip and mail the coupon below.

There is a difference in polyethylenes—

specify **ALATHON**® polyethylene resin

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Department,
Room 718, Du Pont Building, Wilmington 98, Delaware
In Canada: Du Pont Company of Canada Limited,
P. O. Box 660, Montreal, Quebec.

Please send me complete information on Du Pont ALATHON polyethylene resins. I am interested in evaluating these materials for

_____

Name _____

Position _____

Firm Name _____

Street Address _____

City _____ State _____

Type of Business _____

construction and maintenance DIGEST

- **Efficiency with low power**
- **Ringer wins for you**
- **More power—less space**
- **A lasting wire**
- **Happy Anniversary**

Published every week to help you get the most out of your materials and supplies dollar

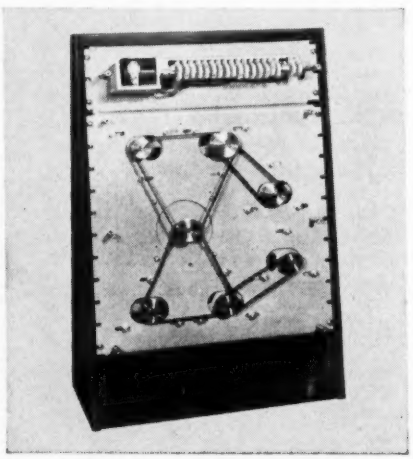
by C. J. Reynolds, Stromberg-Carlson Company

Two dividends are yours when you order supplies from Stromberg-Carlson. First, you get the protection of a double guarantee—ours and the maker's. This assures you of getting the finest products, backed by our 62-year reputation. Second, your support is used to further the art of telephony. We're knee-deep in this industry as a full-time job, not a side line, and your supply business plays a big part and helps us continue our research for new and better telephone equipment.

Ringing panel uses only 360 watts

The full-load power consumption of the AC Ringing Panel shown here is only 360 watts, regardless of output frequencies.

This low power consumption allows the machine to operate continuously without excessive operating costs.



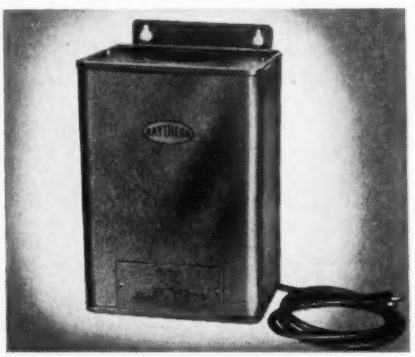
New ringing panel — either AC or DC driven.

The new Holtzer-Cabot 25 Watt Multi-Frequency Ringing Panel is available either AC or DC driven for all the standard frequencies—harmonic, synchromonic, or decimonic.

Since the generated frequencies of the primary and standby machines have identical wave-shapes, ringers adjusted to the primary unit will ring equally as well on the standby unit.

How to get humless DC *and* 20-cycle ringing in one unit

In a case that's just barely big enough to carry a husky lineman's lunch, you can get plenty of power.



Both battery eliminator and 20-cycle ringer are combined in one small unit, providing 1 ampere, 24 volts.

We're talking about the Raytheon RectiRingeR, which measures only 7⅜" x 12¾" x 6". Here, in one compact little unit, you get **both** a battery eliminator and 20-cycle ringer.

This unit includes the Recti-FilteR, the DC power source that has been proven by years of service for Independent telephone companies. It supplies humless, regulated DC power, with 20-cycle ringing power.

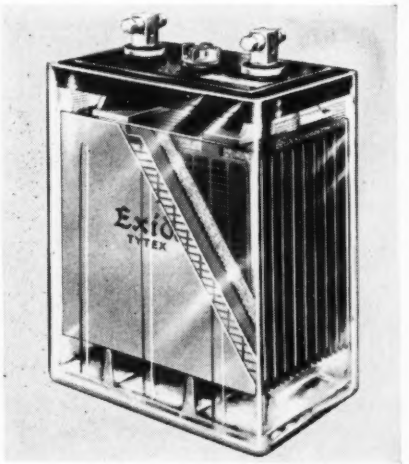
Economical, silent in operation, the RectiRingeR is easy to install. And it has a special relay which **instantly** brings in "stand-by" power in the event of an AC failure.

Taper-less battery saves space

How would you like to pack more power in less floor space?

The essential feature of the Exide Tytex Battery is the manner in which the element is held together in a strong compact unit. This feature has been achieved by assembling its element in a molded glass jar having no taper in its vertical sides . . . thus more power in less space.

Among other features of the battery are the balanced positive and



Exide Tytex Battery has vertical sides.

negative plate design which, together with the use of Mipor separators and Vitrex retainers, contribute to long battery life, less weight per ampere hour output and more attractive looking cells which improve the appearance of the installations.

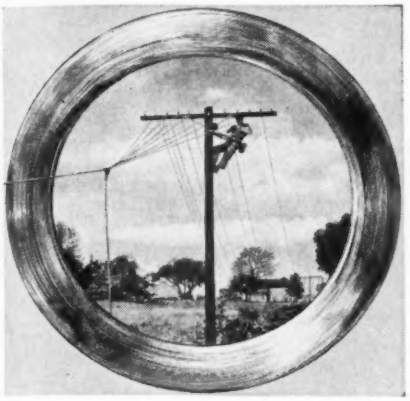
This top performer brings you low-budget operation

If you'd like to reduce the cost of installing and maintaining telephone lines, may we suggest a rugged wire that staunchly defies wind, ice, and snow?

Copperweld Telephone Line Wire is known as a faithful friend, having wonderful transmission qualities and long, rust-resisting

XUM

life. It lasts and lasts and lasts—saves you maintenance or replacement costs.

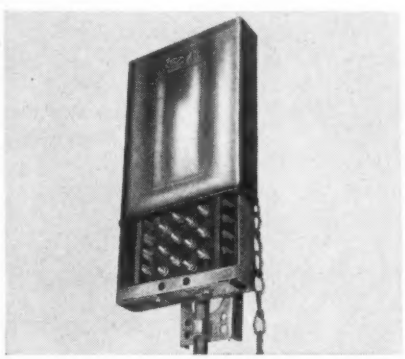


Copperweld Line Wire "talks better," and cuts your maintenance costs.

For short subscriber loops and secondary toll lines, we recommend .080"-30 E.H.S. and for toll lines and long subscriber loops, .104"-40 H.S.

The Silver Anniversary Terminal

Time Tested, Time Proved. Yes, the past 25 years of experience has proved the Cook XB Cable Terminal is the best of its kind.



Unprotected XB Cable Terminals, available in 6-, 11-, 16-, and 26-pair sizes, with or without stub.

The features are: A patented Bakelite faceplate and fanning strips moulded in one piece; non-corroding everdur studs that cannot twist or turn; sturdy, reversible zinc hood for taking stub out top or bottom; patented weather guards at the drop wire opening, all combine to make this unit the outstanding unprotected terminal on the market.

Distributed by

STROMBERG-CARLSON

A DIVISION OF GENERAL DYNAMICS CORPORATION

Sales Offices: Atlanta 3, Chicago 6, Kansas City 8, Rochester 3, San Francisco 3.

the Fairfield County sheriff's department for their assistance in a recent accident in which three persons were injured, it was reported on July 17.

Signed by Sheriff Dudley Crider and Deputy Harold Allen, the letter of commendation credited Mrs. Griffity and Mrs. Campbell for action "that prevented more serious personal injuries" to the persons involved.

Answering a call, these Lancaster employes heard someone screaming for the sheriff and an ambulance. They determined which ambulance was nearest the scene, and called it. This time-saving factor was considered as preventing more severe personal injuries, because one of the victims was pinned under one of the cars.

REA Seeks Radio-Telephone For Use in Rural Areas

An engineering project which seeks to develop direct and speedy radio-telephone service for isolated rural areas was announced on July 27 by the U. S. Department of Agriculture. The project has been planned by Rural Electrification Administration engineers and will be carried out in collaboration with private firms under contract with the department.

While radio-telephones are in use by mobile subscribers and to some extent in rural areas, present equipment requires the subscriber to make a connection by voice communication with an operator. The object of the present project is to develop equipment that will work satisfactorily directly into auomatic telephone switching equipment. This development would require a change in the Federal Communication Commission's regulations concerning logging of calls, and such a change has been requested by the department.

In the development project, the department is ordering experimental dial-operated radio-telephone equipment from two companies. Under each of the contracts, REA expects delivery in about six months of a dial-operated small fixed station operating on 110 volts for isolated subscribers, an automatic base station, and two dial-operated mobile units of 30 watts and 60 watts respectively.

After development and manufacture, the equipment will be installed on REA-financed telephone systems and tested by REA engineers for a year or more to determine costs and quality of service. It is hoped that the test will show costs substantially below those of wire lines for isolated rural establishments while providing equivalent quality of service.

REA anticipates that the new equipment might serve rural areas in three ways:

(1) By providing telephone service to isolated ranches and farm homes in areas that cannot be served by wire lines.

(2) By providing mobile subscriber service where that is desired for farm, commercial or industrial use in automobiles, trucks and boats.

(3) By providing radio-telephone communication between the telephone office and its own mobile units for maintenance and operation.

With the development of transistors, it may be possible for the fixed-station radio-telephone to continue operation in electric power emergencies, by use of a recently developed lifetime rechargeable battery.

COLLEGE STUDENTS REPORTS

Concluded from page 27

Aug. 1, 1954. The building was occupied on Mar. 3 of this year. A two-story structure, it houses the toll switchboard and automatic equipment and the business office on the first floor, office space on the second floor, and the engineering department in the basement.

The new switchboard will handle all long distance calls until intertoll dialing is available in Grinnell which will be in June, 1957. The switchboard will probably be expanded in the future.

Looking toward the future, Iowa Continental has created a satellite exchange in the Rock Creek area about eight miles from Grinnell. Just recently formed, Rock Creek Lake is the largest artificial lake in Iowa. Everette Kahl, division manager, explained, "As it is an area certainly due for tremendous growth, we felt modern telephone facilities should be provided immediately."

General of NW Purchases Two Exchanges

General Telephone Co. of the Northwest, Spokane, Wash., took over operation of the Mesa and Eltopia, Wash., exchanges on Aug. 1, it was announced by Arthur B. Anell, General's division manager at Kennewick.

Official transfer of the two properties to General was completed with the signing of the papers by Paul Baldinger, owner of the former Columbia Flats Telephone Co., which operated the exchanges. Approval of the transaction was given the previous week by the Washington Public Service Commission.

Chance to Save Time

"A friend of mine used to say, 'This advice costs you nothing and is worth every cent of it.' Although there is still no substitute for experience, useful advice is less costly than experience."—HARRY F. VICKERS, *president, Sperry Rand Corp.*

XUM

Approves Wisconsin Bell's Firing of 'Security Risk'

An arbitrator has decided that the Wisconsin Telephone Co. had the right to discharge an employe to whom the federal government had denied security clearance, reported the Milwaukee (Wis.) *Sentinel* on July 19.

Prof. Thomas P. Whelan, Marquette University professor and an attorney and labor-management disputes arbitrator, made the decision in the case of Stephen L. Kreznar, former president of Local 5501, Communications Workers of America, who was discharged on Jan. 25.

The company dismissed Kreznar after the U. S. Defense Department reported its industrial personnel security board decided any clearance previously given Kreznar should be suspended.

Kreznar said at the time that the government had alleged there was "reason to believe" he was a member of the Socialist Workers Party (SWP), a Trotskyite group listed as subversive by the U. S. Attorney General. Kreznar said he was not a member of SWP although he had been active at one time in activities sponsored by the group.

Although Whelan's arbitration decision is final under the company-union contract, Kreznar said on July 19 he is still waiting to learn the outcome of a May 30 hearing in New York before a Defense Department hearing board.

At this proceeding, he said, he challenged the clearance program in general as unconstitutional, and asserted that in this specific case the Defense Department had no jurisdiction to act because the Wisconsin Telephone Co. had no security-sensitive contracts upon which he might have been employed.

Kreznar said the company had asked the Defense Department in September 1954, for clearance on himself and about 18 other installers of private branch exchanges who might have been needed on a sensitive contract the company expected to get.

The sensitive job never developed, he said, but the clearance report did, on Jan. 13, and resulted in his discharge.

"The Defense Department says it doesn't deal with hypothetical cases," Kreznar said. "Maybe I will turn out to be a hypothetical case without a job."

He termed Whelan's decision "outrageous," and said he couldn't see how companies could ask clearance when there is no need for it. They can "use government agencies to investigate anybody they want, for highly dubious motives," he charged.

Whelan's decision dealt only with the question whether the company had cause to discharge Kreznar under its contract. Whelan was not required to go into either the clearance procedure or Kreznar's fitness for clearance. He found that the company's action was "a reasonable exercise of its inherent rights and functions," both under the contract and "particularly under the paramount interest of national security."

Officials of the Communications Workers Union, which had moved for the arbitration, could not be reached for comment.

Symposium on Optics and Microwaves Scheduled

A Symposium on Optics and Microwaves will be held at Lisner Auditorium, George Washington University, Washington, D. C., on Nov. 14, 15 and 16.

The meeting is jointly sponsored by the Institute of Radio Engineers (IRE) Professional Group on Antennas and Propagation, the George Washington University and the Optical Society of America.

The technical program will consist of six sessions, each embracing a subject of general interest to all persons who deal with optical phenomena in research or application in the fields of engineering, medicine or the related physical sciences. Survey and tutorial type papers will be presented to encourage understanding of the basic physics underlying fundamental characteristics which relate optics and microwaves as the two concepts now exist.

It is the purpose of the symposium to promote interest in the primary common problems associated with optics and microwaves, and to demonstrate that these lie within the scope of modern theoretical and practical optics which relate such diverse fields as human vision and radio astronomy.

Advance registration for the meeting is $2.50 and may be made by mailing a check for that amount to: Symposium on Optics and Microwaves, P.O.B. 355, Falls Church, Virginia. Registration at the door is $3.50.

Further information is expected to be available in the October issue of the *IRE Proceedings.*

Bell Museum in Nova Scotia

Baddeck, Cape Breton, Nova Scotia is the site for the Alexander Graham Bell Museum, built recently under the

ADD A
FLOTROL
TO YOUR
ROTARY EQUIPMENT
for:
• Better Voltage Regulation
• Sizeable Power Bill Savings
A telephone exchange now using DC generators for charging the batteries can add one or more FLOTROLS and immediately obtain the precise voltage regulation characteristics of the FLOTROL for the entire exchange. The high efficiency of the FLOTROL will greatly reduce power consumption during those hours of the day when the FLOTROL alone is sufficient to carry the entire load; generators can be shut off during light load periods, thereby reducing the wear on the rotating equipment. By installation of FLOTROL capacity sufficient to carry the entire normal load, rotating equipment showing signs of wear can be saved for standby service, continuing its life indefinitely. The advantages obtainable from this type of installation are tremendous. For further information, send for Bulletin 161.
FLOTROL
PARTNERS IN DEPENDABILITY
SUB-CYCLE
LORAIN PRODUCTS CORPORATION
1122 F ST. • LORAIN, OHIO

auspices of the Canadian government. Dedication date: Aug. 18. Bell's original telephone plus displays of his other inventions will be on view.

Ohio Bell Installer Thanks His Safety Glasses

Another pair of eyes might not be reading this item if they had not been wearing safety glasses.

Bill Barnes, Canton installer for Ohio Bell, is now telling everybody to "Protect Your Eyes."

Bill was working on a terminal pole tracing drop wires, much the same way he had numerous times since his transfer to the installation department a year ago.

Then, it happened—he leaned on a cable—a strand of which was dead-ended. The serving wire was rusty and let loose, causing the tail of the strand to whip up and hit—not his eyes, but his safety glasses.

If you hesitate about putting on your safety monogoggles or safety glasses, ask Bill what he thinks about eye protection.

Bureau of Standards To Be Relocated

A tract of approximately 550 acres of land near Gaithersburg, Md., has been selected for relocation of the Washington laboratories of the National Bureau of Standards. The move will permit the bureau to plan new buildings to replace present research facilities, which over the past 50 years have become inadequate for current needs.

The bureau occupied its present site on Connecticut Avenue in Washington in 1903. Since that time its responsibilities have greatly increased, largely as a result of the rapid expansion of technology and the growth of scientific research. Extensive programs of research and development must now be conducted in the physical sciences and engineering to meet the needs of science and industry for new and improved standards and measurement methods. The new site will enable the bureau to plan for a more up-to-date plant consistent with its continually increasing responsibilities.

It is expected that the new location will make possible a more modern research operation in structures that can be very efficiently managed. In addition, the new site will provide the benefits of a rural location where scientific programs can be undertaken without interfering in community life and without urban interference to important bureau projects. The rural location will remove the bureau's work

LOOK TO

LINDSAY

FOR

reliability

What You Want
When You Want It

Prompt delivery of your order as specified is assured by Lindsay's fast, efficient, *personalized* service . . . plus a complete line of nationally known telephone supplies. Remember—Lindsay *specializes* in telephone supplies *only*—your guarantee that you can "Look to Lindsay" for satisfaction on every order. Phone or write for immediate delivery or required data.

THE LINDSAY TELEPHONE SUPPLY CO.
10409 Meech Ave., Cleveland 5, Ohio
Tel. Diamond 1-9212

from the variety of mechanical, electrical, and atmospheric disturbances present in a city and will reduce the effect of these forces upon precise scientific measurements.

In addition to its Washington laboratories, the bureau maintains a major research center in Boulder, Colo., and 20 widely scattered field stations. The Boulder Laboratories are concerned with radio propagation research, radio standards, and cryogenic engineering. Most of the field stations are engaged in gathering data on radio propagation.

ASTM Announces Standards On Metallic Conductors

All of the ASTM (American Society For Testing Materials) Standards pertaining to metallic electrical conductors, which were developed by ASTM Committee B-1 on Wires for Electrical Conductors, and related standards from other committees of the ASTM have been compiled in compact, readily usable form.

The December 1955 edition of ASTM Standards on Metallic Electrical Conductors includes in their latest form 52 ASTM standards—43 specifications, seven test methods, one recommended practice and one classification of coppers.

Standards cover: (1) Copper, copper alloy and copper-covered steel; wire; stranded conductors; rods, bars and shapes; pipes and tubes (2) aluminum: wire; stranded conductors; rods and bars; (3) galvanized steel core wire; and galvanized iron and steel guy, messenger, span, overhead ground, and line wire.

Of the material included in this compilation, 20 of the specifications have been revised and one of the standards is new since the previous edition.

Copies of this 300-page book can be obtained from American Society for Testing Materials Headquarters, 1916 Race St., Philadelphia 3, Pa., at $3.50 each.

A.S.A. Names John Scott Head of S. Cal. Chapter

John A. Scott, marketing and development engineer of the General Telephone Co. of California, Santa Monica, was recently elected president of the southern California chapter of the American Statistical Association for the 1956-7 term.

He will succeed Hugh H. Brown, retiring president and research statistician for the California Taxpayers Association, at the first regular fall meeting in September.

Charles I. Landenberger, senior engineer, The Pacific Telephone & Telegraph Co., Los Angeles, was elected secretary of the association.

Telecommunications Role in Economic Development, Told

The United Nations' Technical Assistance Board, in a recent interim report, stated:

"In participating in the expanded program, ITU (International Telecommunication Union) has gathered some important information on the role of telecommunications in economic development. The advances made in such areas with the help of technical assistance in various sectors of the economy create a growing need for telegraph and telephone services.

"The number of new telephone subscribers and the waiting list of applicants . . . are an indication of needs which result from the development of economic activity and the raising of living standards.

"Requests for the improvement or construction of trunk lines connecting isolated areas of a country reflect the desire of such areas, hitherto depending on their own resources, for participation in the national life.

"Financing of telecommunication systems and the shortage or absence of skilled labor are major difficulties encountered by governments. In 1955, ITU sought to place the main emphasis on the training of staff, and the 25 fellows who received such training in 10 host countries were part of the technical training program necessary to develop telecommunications.

"Of the 20 experts provided by ITU to nine governments, five were principally concerned with the training of operating staff; and in other countries the experts either gave instructions themselves in existing technical schools or trained local staff serving as their assistants to continue their work after their departure.

"In telecommunications a relatively long period is required to carry out plans owing to the need for constructing and installing complicated equipment. Missions are often lengthy and can be shortened only in special cases. In planning technical assistance on telecommunications, it must be borne in mind that such assistance can be effective only if it is continued throughout the time necessary to produce concrete achievements."

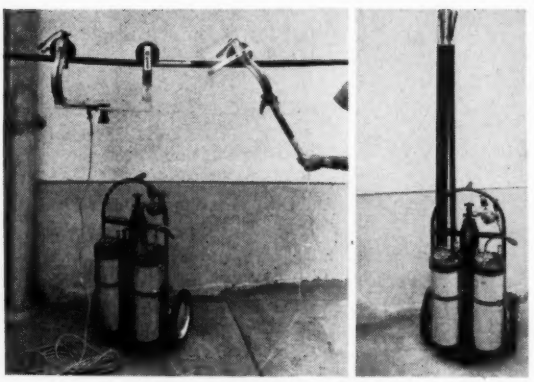
Management Tip

". . . the smaller the business, the bigger the man on top has to be."—*from the book "Cash McCall" by* CAMERON HAWLEY.

S&G

Leak Detection in Minutes!

Leak Detector Applicator



Castings—aluminum for light weight

Safety Brackets—Steel galvanized

Nozzle and Piping—brass

Liquid Line — heavy wall plastic tubing

Liquid Tank—steel galvanized and brass fittings

Wheel—nylon bearings, self-lubricating

MODEL LD-1 & LD-2

Both models use highly successful chemical type leak detector. Applicator's dual nozzle sprays both sides of pressurized cable, giving 100% coverage. Bubble cluster forms around leak within minutes and can be clearly seen from the ground. Air pressure bottle in cart supplies regulated pressure in solution tank at all times, can be adjusted for different heights.

write or phone

S & G MANUFACTURING CORPORATION

P. O. Box 1309 • New Orleans 10, La. • RAymond 3142

International AE Transfers J. B. Behling to Chicago

James B. Behling has been assigned to the Chicago headquarters of International Automatic Electric Corp. and has been appointed export district manager of the Caribbean area and Central America.

Mr. Behling joined the Automatic Electric group in 1950 as assistant to

J. B. BEHLING

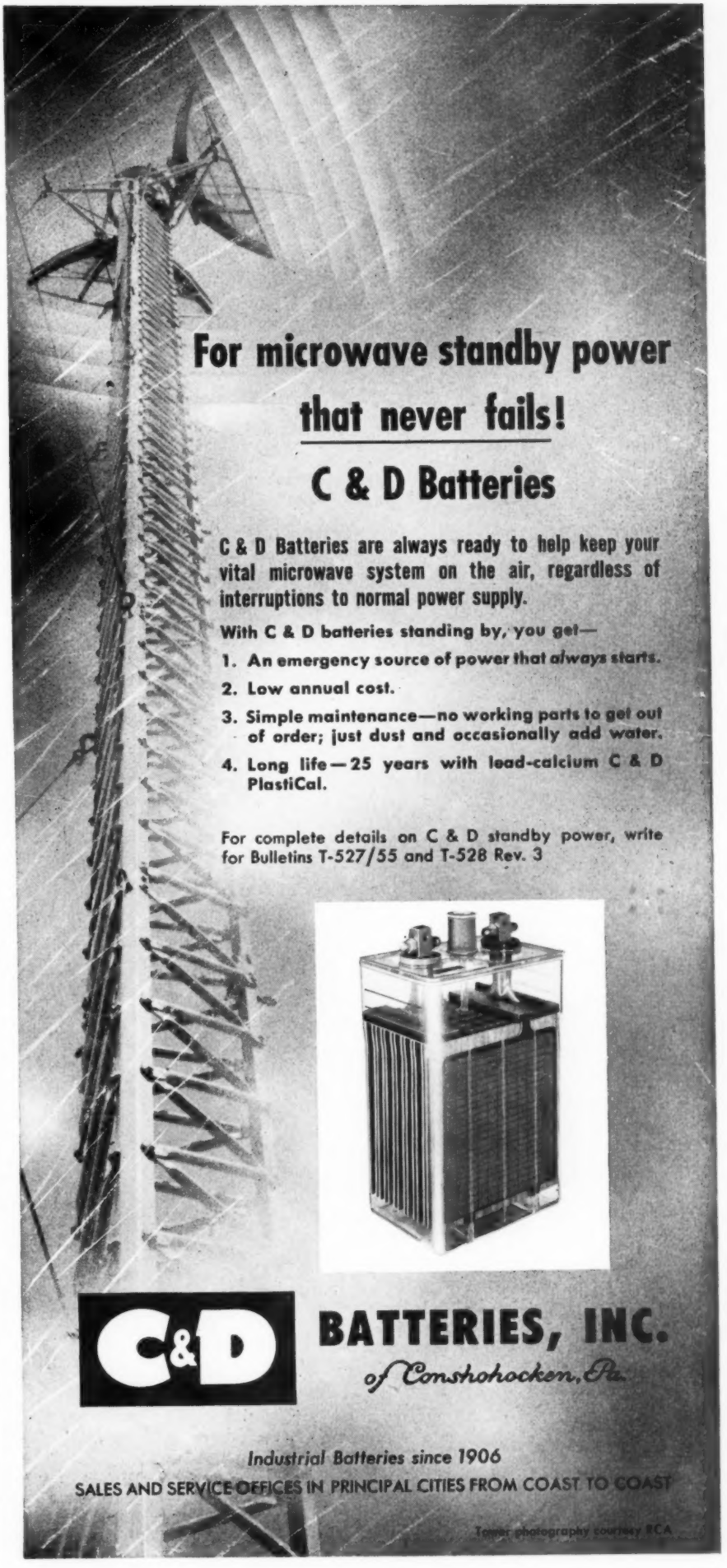
the export manager. In 1952 he was promoted to division manager for Latin American exports, and in 1954 was named staff engineer at the International offices in New York City, a position he held prior to his present position.

During World War II, Mr. Behling was a communications officer (Lt. j. g.) aboard the Destroyer USS Harwood. At war's end, he served two years with the United Nations Relief and Rehabilitation Administration (UNRRA); two years with the United States Economic Cooperation Administration (ECA); and briefly with the State Department, prior to joining Automatic Electric.

He is a native of Amery, Wis., and attended Wisconsin State College and the American Institute for Foreign Trade.

Long-Term Confidence

"One of the most convincing indications of an upsurge in the economy is the confidence in the future exhibited by businessmen. There is a growing realization that capital investment must be planned for the long pull, with little weight given to intermediate cyclical fluctuations in business activity. These new attitudes constitute one of the most important changes in our economy in recent years."—GORDON W. MCKINLEY, *head economist, Prudential Insurance Co. of America.*


For microwave standby power
that never fails!
C & D Batteries
C & D Batteries are always ready to help keep your vital microwave system on the air, regardless of interruptions to normal power supply.
With C & D batteries standing by, you get—
1. An emergency source of power that always starts.
2. Low annual cost.
3. Simple maintenance—no working parts to get out of order; just dust and occasionally add water.
4. Long life—25 years with lead-calcium C & D PlastiCal.
For complete details on C & D standby power, write for Bulletins T-527/55 and T-528 Rev. 3
C&D
BATTERIES, INC.
of Conshohocken, Pa.
Industrial Batteries since 1906
SALES AND SERVICE OFFICES IN PRINCIPAL CITIES FROM COAST TO COAST
Tower photography courtesy RCA

ENDURPRENE

• DROP • BRIDLE

PREMIUM GRADE INSULATION—TOUGH, ENDURING NEOPRENE JACKET

A COMBINATION HARD TO BEAT FOR LONG-RUN ECONOMY AND RELIABILITY

DISTRIBUTED BY

KELLOGG

KELLOGG SWITCHBOARD AND SUPPLY COMPANY

A Division of International Telephone and Telegraph Corporation

MANUFACTURED BY

GENERAL INSULATED WIRE WORKS, INC. PROVIDENCE, R. I.

FTL Laboratories Expand On East and West Coasts

Expansion of Federal Telecommunication Laboratories, Nutley, N. J., research center of International Telephone & Telegraph Corp., will be carried out at locations on both coasts to keep pace with the accelerated needs of the electronic industry, it was announced on July 23 by IT&T's president, Edmond H. Leavey.

The Laboratories will break ground on Aug. 1 for a new building in the San Fernando Valley, Cal. The expansion program also calls for construction of a new laboratory and office building on the Nutley site.

The West Coast labs will be in a one-story, 22,400-square-foot structure, on a 9.65-acre site adjoining the California operations of Federal Telephone & Radio Co., Clifton, N. J., manufacturing division of IT&T. The building will be the first of three to be erected at total cost of approximately 2½ million dollars. Occupancy is planned for early next year.

The proposed 80,000-square-foot building in Nutley will be part of an eastern expansion program to provide facilities for an anticipated increase of more than 400 engineers and scientists by 1958.

"It is planned to increase our technical staff by 120 each year for the next three years," said Henri Busignies, president of the Laboratories. "A stepped-up recruiting program already has given us an increase of 80 engineers and scientists this year. The demands on us by the military departments and by private industry to supply electronic equipment will require additional space and trained personnel.

The expansion program at Nutley will necessitate the addition of 300 non-engineering personnel, bringing the total of employes to about 2,700, an increase of over 700.

The California branch of the Laboratories, currently occupying a portion of the building, is expected eventually to employ 135 persons. With a small nucleus of personnel, it has already made strides in research on digital computers for aircraft, inertial navigation systems, and other navigation devices, and maintains close liaison with aircraft manufacturing organizations in the California area.

Federal Telecommunications Laboratories traces its origin to both the European laboratories of IT&T and to the Federal Telegraph Co., founded in Palo Alto, Cal., in 1911, where Dr. Lee de Forest perfected many of his vacuum tube advances. Federal Telegraph moved to Newark, N. J., some years later, and eventually became a part of the IT&T System.

The new Nutley building was made possible by IT&T's purchase in 1941 of the 100-acre tract of the Yountakah Country Club. When the Laboratories moved to Nutley in 1946, there were a total of about 750 employes. By 1950, this number had increased to nearly 900, and in the following year jumped to more than 1,400.

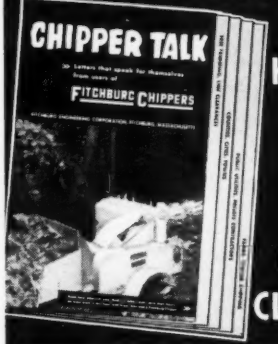
Stromberg's R. C. Tait Addresses Management Group

Robert C. Tait, president of Stromberg-Carlson and a senior vice president of General Dynamics Corp., of which Stromberg-Carlson is a division, was one of the speakers at a management course for presidents conducted at the Colgate University campus, Hamilton, N. Y., on July 30 to Aug. 3, under auspices of the American Management Association, of which he is a director.

Mr. Tait discussed "Long Range Planning in a Manufacturing Company."

The management course for presidents is an intensive five-day program of study, instruction and discussion on business management problems. Participants were 50 presidents and board chairmen of American corporations.

Yours FREE! NEW Portfolio



TELLS HOW TO SAVE MAN HOURS IN LINE CLEARANCE

Shows you cutaway color drawings of the Fitchburg Chipper, complete specifications, safety features, letters from users.

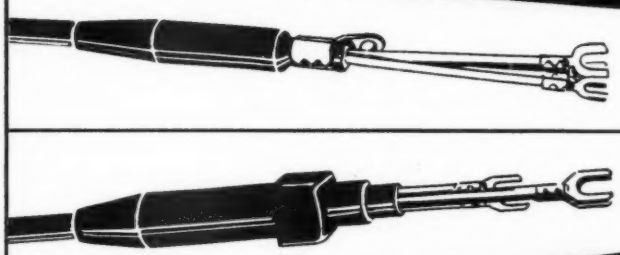
Mail coupon for your copy today!

FITCHBURG ENGINEERING CORPORATION
Fitchburg, Mass., Dept. T-86
Send your free portfolio CHIPPER TALK
*Name*_____
*Company*_____
*Address*_____
*City*_____ *State*_____

DEPARTMENT OF TECHNOLOGY BUFFALO AND ERIE COUNTY PUBLIC LIBRARY

XUM

When QUALITY and SERVICE are important



. . . look to COMMERCIAL for

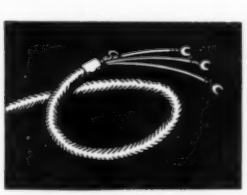
Extra Length Cords
Retractable Handset Cords
Test Cords and
Special Cords for
Inter-Communication Systems
Switchboard Cord Cushions

. . . ALL MADE BETTER TO LAST LONGER . . . ALL READY FOR YOUR CALL! OUR COMPLETE REPAIR DEPARTMENT is AT YOUR SERVICE for quick action on re-butting switchboard cords and re-braiding old cotton switchboard cords with Nylon

- **Handset cords**
- **Deskset Cords**
- **Switchboard Cords with or without plugs**
- **Receiver Cords**
- **Transmitter Cords**
- **Patch Cords**

with tough, long-wearing NYLON, NEOPRENE or MERCERIZED COTTON JACKETS

Write, wire or phone.
Catalog, samples and prices on request.



COMMERCIAL CORD & SUPPLY CO., INC.

CLIFTON SPRINGS, N. Y.

Phone: Howard 2-5111

QUALITY CORDS FOR ALL MAKES AND TYPES OF TELEPHONE INSTRUMENTS

TIME TESTED!

DEPENDABLE SERVICE SINCE 1897! That's the record of Kennecott lead-alloy sheathed Telephone Cable! Exacting quality control goes into *every* step of its manufacture. Rigorous tests check dielectric strength, insulation resistance, conductor resistance, capacitance, density and dimensions. You're *sure* this cable will retain its electrical properties over the years! Call the Chase sales office nearest you for complete information.

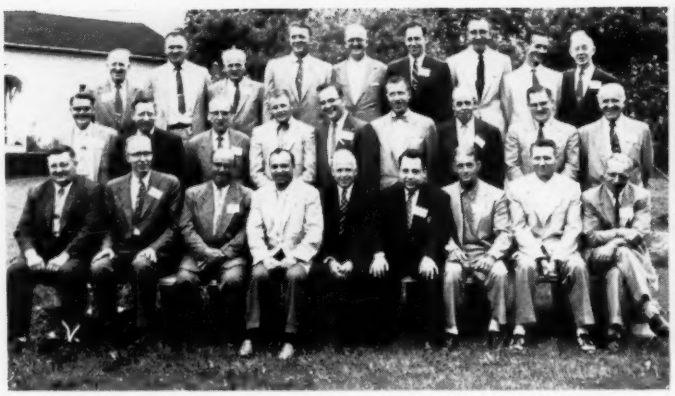
CHASE BRASS & COPPER CO., WATERBURY 20, CONN.
DISTRIBUTOR FOR

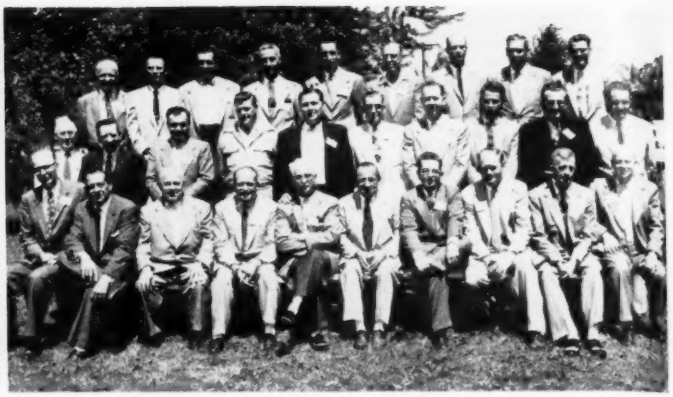
KENNECOTT WIRE & CABLE CO.

SUBSIDIARIES OF KENNECOTT COPPER CORPORATION

CHASE WAREHOUSES and OFFICES:

Atlanta	Cincinnati	Grand Rapids†	Milwaukee	Philadelphia	San Francisco
Baltimore	Cleveland	Houston	Minneapolis	Pittsburgh	Seattle
Boston	Dallas	Indianapolis	Newark	Providence	Waterbury
Charlotte†	Denver	Kansas City, Mo.	New Orleans	Rochester†	
Chicago	Detroit	Los Angeles	New York	St. Louis	(†sales office only)





At the first seminar on Lorain Products Corp.'s equipment (left photo), were (FRONT ROW, left to right): G. H. Pohm and H. M. Huge, both of the Lorain corporation; P. Everitt of Ohio Bell Telephone Co.; C. P. Deval of Kellogg Switchboard & Supply Co.; W. P. Jackman of New York Telephone Co.; E. Stoy of American District Telegraph Co.; C. D. Suhr and Lloyd Ross, both of Ohio Bell, and J. A. Haefner of Automatic Electric Co. (SECOND ROW): R. H. McMillan and C. P. Stocker, both of Lorain Products; R. Hetrick of Ohio Bell; W. D. Watson of Kellogg; I. C. Boettger of Wisconsin Telephone Co.; G. C. Plasmier, S. S. McAndrew, and R. H. Stoll, all of Automatic Electric Co., and J. E. Yarmack of the Lorain corporation. THIRD ROW: R. K. VanDeusen, of the Lorain corporation; D. W. Chappell of General Telephone Co. of Wisconsin; E. Alexander of Stromberg-Carlson Co.; L. K. Lehner and W. C. Lore, both of Ohio Bell; R. S. Parker, of American District Telegraph Co.; C. A. Mutchler of General of Wisconsin; E. C. Landry of Stromberg, and H. T. McCraig of the Lorain company. At the second seminar were (BOTTOM ROW, left to right): H. M. Huge of the Lorain company; Paul Green of Ohio Bell; H. W. Selle of Stromberg; C. R. Bitson, L. D. Moore, L. M. Patterson, W. E. Scott, John G. White and F. Sharkey, all of Ohio Bell, and R. K. VanDeusen of the Lorain company. MIDDLE ROW: H. T. McCaig and C. P. Stocker, both of the Lorain company; M. Smith of Leich Electric Co.; G. B. Randall of General of Wisconsin; W. R. Via, C. R. Hendrickson and J. A. Hinkle, all of Ohio Bell; E. J. Sullivan of Stromberg; R. H. Listman of Automatic Electric; and N. M. Werner of the Lorain company. TOP ROW: J. E. Yarmack of the Lorain company; W. E. Dobbeck of Leich; H. J. Donaldson of General of Wisconsin; W. J. Hodrus of Ohio Bell; R. M. Clements and Harold M. Howe, both of Kellogg; W. F. Sintz of Ohio Bell; A. H. Kroon of Automatic Electric, and R. H. McMillan of the Lorain company.

Lorain Products Holds Seminars on Equipment

The latter part of June the Lorain Products Corp. extended an invitation to several of their distributors and major users of their power and communication equipment to visit their factory in Lorain, O. and to attend a two-day seminar.

The primary purpose of these two sessions was to give first-hand information on the operation and installation of Flotrols, Sub-Cycles and other allied equipment manufactured by Lorain.

The first session was attended by 20 guests (left photo above) and the second session was attended by 22 guests (right photo above). It is expected that additional sessions will be held at later dates.

Out of Respect to Country

"George Washington explained why men owe some of their time to their country. He said, '. . . every citizen who enjoys protection of a free (unoppressed) government owes not only a proportion of his property but even his personal services to the defense of it.' . . . When George Washington spoke, the dangers were small compared to the terrible risks of the mid-twentieth century."—Quincy (Mass.) *Patriot Ledger.*

an invitation to patronage...

the B N BOOTH

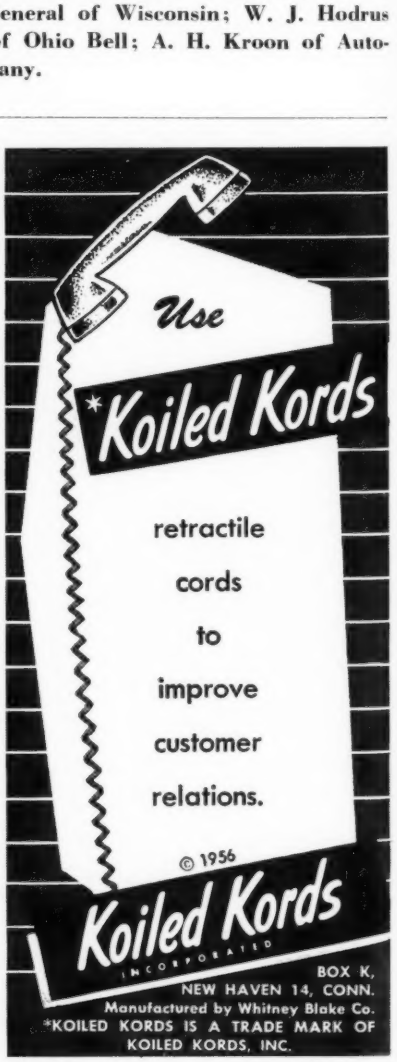
In thousands of locations, B-N Booths have demonstrated their customer appeal and have substantially increased revenues. No detail of materials, design, installation, maintenance and economy has been too small to receive careful attention of our designers. Lightweight durability in a wide variety of attractive arrangements.

Only 326 lbs. shipping weight

Benner-Nawman, Inc.

3421 HOLLIS STREET • OAKLAND 8, CALIFORNIA

For details, write or contact your Distributor



CLASSIFIED SECTION

Rates 15 cents per word payable in advance. Minimum charge $3.00 for 20 words or less.
Classified advertisements must reach us 8 days before publication date.

HELP WANTED

CABLE SPLICERS, Station Installers, Equipment Installers, Linemen. Experienced men needed. Steady work, good pay. Henkels & McCoy, 1211 Kenmore Avenue, Elkhart, Indiana, or 6100 N. 20th St., Philadelphia, Pa.

WANTED: Telephone Installers, Cable Splicers, Linemen, Central Office Installers. Yates Construction Company, 1507 South 6th St., Paducah, Kentucky. Telephone 2-4623.

BOOKKEEPING & ACCOUNTING —Male or female; rural telephone company. Also STENOGRAPHER and FILE CLERK. Man experienced in Stromberg-Carlson exchange work. Good salary. Located in western Montana. Write Box #3860 c/o TELEPHONY.

ACCOUNTANT with thorough knowledge of Class B accounting. Newly organized R. T. A. Coop. Company will operate 600 stations with office located in Lynch. Address inquiry to Boyd County Telephone Corp., Lynch, Neb.

CABLE SPLICERS • LINEMEN
STATION INSTALLERS
STEADY WORK, GOOD PAY
MIDWEST LOCATION.
The Weikel Line Company, Inc.
FORT WAYNE, IND.

TELEPHONE INSTALLERS

STEP-BY-STEP CENTRAL OFFICE EQUIPMENT AND OTHER TYPES

FOR SMALL & LARGE OFFICES IN PENNSYLVANIA AREA

GOOD PAY—ALLOWANCES & TRAVEL EXPENSES

EMPLOYEE BENEFITS INCLUDE:
Group insurance, company paid pension & hospitalization, 2 weeks paid vacation after 1 year service plus others.

Send Details of Experience to Box T461, 221 W. 41st St. New York 36, N. Y.

WANTED TO BUY

TELEPHONES—all types—any condition. Write stating quantities and types. Our truck will pick up within 300 mile radius of Scranton, Penna. Write Box No. 3765, c/o TELEPHONY.

TELEPHONE COMPANY. Must have over 1000 stations. Any location. Write Box No. 3865, c/o TELEPHONY.

WANTED TO BUY
USED CAX DIAL SWITCHBOARDS AND TELEPHONES
TELEPHONE EQUIPMENT, INC.
Montrose, Mich.
Telephone 3801-2211

FOR SALE

PAPER-LEAD TELEPHONE CABLES, 3500 feet 26 pairs, 2500 feet 26 pairs, 5500 feet 51 pairs, 5000 feet 101 pairs, 1500 feet 202 pairs. All 22 gauge. 2500 feet 26 pairs, 24 gauge. Available in Charleston, S. C., for immediate shipment. Made to American specifications by largest West German cable manufacturer supplying many American Independents. Telephone or write: Columbia Technical Corporation, 61-02 31st Avenue, Woodside 77, N. Y. Telephone: AStoria 8-7401.

FOR SALE

FIVE NORTH ELECTRIC GROUND LINE ADAPTER TRUNKS — $33.00 each. F.O.B. your warehouse. Write Hot Springs Telephone Co., Truth or Consequences, N. M.

MODEL B NEALE CABLE LASHERS—brand new—$125; slightly used, perfect condition—$95.00. Write Line Equipment Sales, 529 S. Dearborn St., Chicago 5, Ill. Telephone WA 2-5518.

ONE 1-POSITION KELLOGG MASTERBUILT JUNIOR SWITCHBOARD, 17 Automatic ringing cord circuits, 180 Common Battery lines, 30 Magneto lines. Eight years old—good condition. Write Box No. 3864, c/o TELEPHONY.

25-DIAL FEDERAL TELEPHONES NO. 802 COMBINATION. Good condition — $7.50 each. 10-line Stromberg-Carlson automatic dial unit in good condition, all Relay—$1,000. W. E. Protector Strip with carbon less heat coils, 20 pair—$5.00 per strip. Write Bellevue Telephone Co., Box 256, Henrietta, Tex. Tel.: ID-84634.

TELEPHONE EXCHANGE, Southwest Colorado, 425 Stations, Common Battery, Kellogg Switchboards, Western Electric Handset. Good cable plant. Less than three times gross. Liberal financing. Reason for selling: health. Write Pagosa Springs Telephone Co., Pagosa Springs, Colo.

PRICED FAR BELOW NORMAL

ALL NEW MATERIAL

W.E. #24-CL Switchboard Cable 21 pr. 22 ga. (10,000 ft)
G.E. #12-A Switchboard Lamps 12 volt (12,000 in stock)
G.E. #48-D Switchboard Lamps 48 volt (6,000 in stock)

Federal #8100-AS Battery Charger, 24 volt 24 amp
Selenium Type Regulated

Power Equipment Co. PEC-161 Battery Charger
24 volt 30 amp. Tunger Bulb Type. Manual Reg. (Spare Bulbs)

W.E. #206-BS Selector or Rotary Switches
24 volt Coil. 22 Point 4 Level with
1 Bridging and 3 Non-Bridging Wipers (20 each)

Whatever Your Equipment Needs . . . Call BUTELCO First!

BUCKEYE TELEPHONE & SUPPLY CO.
1250 KINNEAR RD. HU 8-0655 COLUMBUS 21, OHIO

FOR SALE

REBUILT DESK PHONES

No. 1000-BC desk set @ $14.00

A. E. No. 40—St. Line, with Dial @ $16.50

W.E. No. 302-EW. with Conn. Electric hand units @ $13.00

Leich Electric No. 90-A desk set, St. Line @ $8.00

Stromberg No. 1258-W wall Magneto, self contained @ $20.00

Prices are F.O.B. Chicago, Ill.

Independent Telephone Repair Co.
2137 West 21st St. Chicago 8, Ill.

400—Automatic Electric type 21 wall phones with type 41 handset on side, anti side tone circuit, less dial.

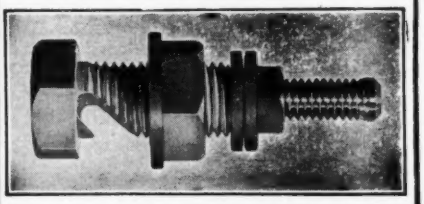
250—Automatic Electric type 42 wall phones with type 41 handset on side, anti side tone circuit, less dial.

500—Kellogg 803 wall phones with type 46-C handset on side, less dial.

270—Kellogg 817 wall phones with type 46-C handset on side, triad circuit, less dial.

If interested contact Warren Ritter, Purchasing Agent, Northern Ohio Telephone Co., Bellevue, Ohio.

No. 6A WESTERN ELECTRIC TYPE Bridging Connector



⅜" Hex Steel Body (slotted for No. 10 B.W.G.) Washer and Nut all zinc plated. Brass stud with 2 brass washers held in place with a hex brass nut. For use on iron to copper wire.

Price per hundred.....$28.00

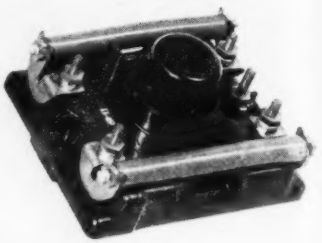
ALL SHIPMENTS F.O.B. PHILADELPHIA

CLEVERLY ELECTRICAL WORKS, INC.
5312 WESTMINSTER AVE.
PHILADELPHIA 31, PA.

POLES

CREOSOTED SOUTHERN YELLOW PINE
LOW RESIDUE COAL TAR DISTILLATE
"Truck Delivery Our Specialty"

THE BAKER WOOD PRESERVING COMPANY
P.O. BOX 355 MARION, OHIO



RECONDITIONED
WESTERN ELECTRIC #98A

Station protectors, complete with two No. 11C fuses, Two No. 2G and Two No. 27 protector blocks

Price.....$ .75 each
Lots of 100.....$ .70 each
Lots of 500.....$ .65 each

RECONDITIONED
FEDERAL #804A

Magneto Compact set convertible to desk or wall. Equipped with capsule type transmitter and receiver. Can be used on long rural lines.

Shipped complete with terminal block and refinished battery box.

PRICE $18.50 EACH
12 or more—$18.00
Terms 2%—10 Days Net: 30

BOHNSACK EQUIPMENT CO.
GERMANTOWN, NEW YORK

COPPERWELD LINE WIRE #12

Savings to 20% New Gov't. Surplus

freight allowances on quantity orders

#12 AWG (.080) 40% conductivity—High Strength

Standard Factory Coils (average 100 lb.)

guaranteed A-1 perfect

— shipped on approval to well rated firms —

(others, sight-draft thru your bank—with full inspection privilege)

— we pay two-way freight if found unsatisfactory —

SLEEVES — TOOLS

Anaconda copper sleeves 3" long—allows 3 crimps for extra strength with Nicopress or Anaconda tool

#12 AWG (.080) C groove
#10 AWG (.102-.104) C groove
per hundred $3.00

Sleeve Tools

Nicopress #31 C groove
new, with key.....$3.75

Anaconda Rolling Tool

type B #6, 8, 10, 12 AWG
good used $3.75

POLE LINE MATERIAL

Hardware—glass—anchors
huge stock—huge savings

—we will allow full freight on car or truck-loads of Copperweld or BB wire, or hardware or combination—

Cable & Terminals
Protection—all types
Switchboards—supplies
Telephones, new & rebuilt

—let us quote on your needs—

Telectric Co.

1218 Venice Boulevard Richmond 8-2249 Los Angeles 6, Calif.

Save Money and Time!

TELEPHONE PRINTING SPECIALISTS FOR 49 YEARS

TOLL TICKETS 1 LOUT on Bond Paper ONLY 40¢ THOUSAND (MIN. 20,000)

TELEPHONE 42-3341

CULLOM & GHERTNER CO.
PRINTERS • LITHOGRAPHERS
600 21ST AVE., N. • NASHVILLE, TENN.

Good USED Ford, Dodge and Chevrolet Line Trucks
Five Man Cabs, Double and Single Drum Winch, and Boom
Fully RECONDITIONED AND PAINTED Your Color $1,995.00

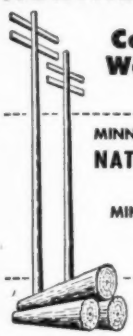
Telephone Installer Trucks Also Available

NEW PROSPECTOR and STERLING DIGGERS
Factory Rebuilt, Used Earth Boring Machines

ASK ANY OWNER About Our NEW and USED EQUIPMENT

WYOMING VALLEY EQUIPMENT DIV.
714 WYOMING AVENUE KINGSTON, PENNA.
Phone BUtler 7-3158-59 — 8-3196

NORTHERN WHITE CEDAR



Coast Douglas Fir
Western Red Cedar

Plants and Yards:
MINNEAPOLIS, MINN. • SPOKANE, WASH.
NATIONAL POLE and TREATING DIVISION
MINNESOTA AND ONTARIO PAPER COMPANY
Minneapolis 2, Minnesota

Branch Offices:
CHICAGO • SPOKANE

ATLANTIC
Creosoting Co., Inc., 17 Battery Pl., N. Y. C.
Creosoted Pine Poles • Crossarms
PLANTS AND OFFICES
Boston, Mass. Portsmouth, Va.
New York, N. Y. Philadelphia, Pa.
Savannah, Ga.

L. D. McFARLAND COMPANY
Box 390 • Sandpoint, Idaho
WESTERN RED CEDAR, DOUGLAS FIR, WESTERN LARCH AND LODGEPOLE PINE. CREOSOTE AND PENTA BUTT OR FULL-LENGTH TREATED.

INSPECTION SERVICE
Of poles, crossarms, and preservative treatments. Analyses of wood preservatives. Consulting and specification writing. Inspectors stationed throughout U.S.A.
A. W. WILLIAMS INSPECTION CO., INC.
MOBILE, ALABAMA
ESTABLISHED 1921—MEMBER A.C.I.L.

CABANISS-POGUE COMPANY
Consulting Engineers
Appraisals—Cost and Rate Studies
Financial Assistance
GRANT BLDG., ATLANTA, GEORGIA

CARL C. CRANE, INC.
Consulting Engineers
2702 Monroe Street, Madison 5, Wis.
Telephone CEDAR 3-4210

SLOAN, COOK & LOWE
CONSULTING ENGINEERS
Appraisals—Original Cost Studies
Plant, Traffic and Commercial Engineering
120 S. La Salle St.
Chicago 3, Ill. Tel.: FRanklin 2-5924

T. A. HEYWOOD
Telephone Services
Engineering Pole Line Construction Cable Splicing Operations Installations Maintenance
Specializing in R.T.A. Engineering
Box 197
Goshen, Ohio Phone REgent 4-4741

What You Want
When You Want It
Immediate Shipment from
Nearest Warehouse Points
TELEPHONE & POWER SUPPLY, INC.
TOPEKA, KANSAS PHONE 4-8788

TELEPHONE PRINTING
By People Who Know
the Telephone Business
SEE THE SUTTLE CATALOG
SUTTLE EQUIPMENT CO.
LAWRENCEVILLE ILLINOIS

ROBERT E. FOLEY CONSTRUCTION CORP.
DESIGN—SURVEYS—APPRAISALS—Construction and Maintenance of Overhead and Underground Telephone Plant. Complete supply of poles available for emergency requirements.
48 GRISWOLD STREET
BINGHAMTON, N. Y. TEL. 2-7215

Construction Crews Station Installers
Central Office Installations
Cable Splicers Complete Engineering
HENKELS & McCOY
6100 North 20th Street Philadelphia, Pa.
Now Operating in 30 States

TUDOR AND YAGER, INC.
Telephone Construction
TIPTON, INDIANA
PHONE 125

New & Used
Diggers • Bodies • Aerial Ladders
Complete Line of Special Telephone Equipment
Sales • Service • Rentals
UTILITY EQUIPMENT COMPANY
P. O. BOX 9507
OKLAHOMA CITY 18, OKLAHOMA

CONTRACTORS
Builders of Outside Telephone Plants
MORTON CONTRACTING CO.
UNIT OR HOURLY RATES
BOX 11 • 6-6296 • PEKIN, ILL.

DAVIS
CONSTRUCTION COMPANY
UTILITY PLANT CONSTRUCTION
45 North Clark Street • Sullivan, Missouri

NEALE
CONSTRUCTION CO.
ENGINEERING • CONSTRUCTION • MAINTENANCE
TOPEKA, KANSAS PHONE 4-2621

POLES

B. J. Carney & Co., 100 N. 7th St., Minneapolis, Minn.—Western red cedar poles. Pentrex Butt Treated or Plain.

Cascade Pole Co., P.O. Box 743, Tacoma, Wash. — Creosoted Douglas Fir and Cedar Poles.

C. M. Christiansen Co.—Northern White Cedar Poles, Pentachlorophenol treated. Plant and Yards, Phelps, Wis.

Dierks Forests, Inc. (formerly Dierks Lumber & Coal Co.) Wood Preserving Division, 700 Dierks Building, Kansas City, Mo. Southern Pine select poles, all sizes and lengths, creosote and pentapressure treated. Prompt shipment.

Eppinger & Russell Co., 80—8th Avenue, New York 11, N. Y.—Creosoted Poles and Cross Arms. Plants: Jacksonville, Fla., Norfolk, Va., Eddington, Pa.

International Creosoting and Construction Co., Galveston, Texas.—Creosoted Southern Yellow Pine Poles. Plants Beaumont and Texarkana, Texas.

The Long-Bell Lumber Co., 926 Grand Ave., Kansas City, Mo.—Pressure-treated Southern Pine and Douglas Fir Poles. Creosote and Penta preservatives.

Texas Creosoting Company—512 Main Street, Orange, Texas—Creosoted Southern Yellow Pine and Douglas Fir Poles. Can also treat with "Penta."

ROADSIDE BONANZA!

You'll strike a ROADSIDE BONANZA with more Roadside Pay Stations spotlighted with P and A

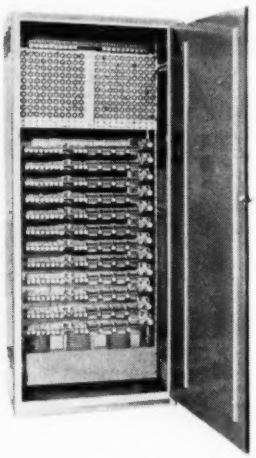
Reflectorized P and A TELEPHONE *Signs*

- Booth and Approach Signs
- Weather Resistant . . . Longer Lasting
- Long-Range Visibility . . . Day or Night
- REFLECTORIZED BRILLIANCE with "Scotchlite" brand Reflective Sheeting.

GET CATALOG
AND PRICES TODAY
TELEPHONE SPRINGFIELD 4-0189

P and A Manufacturing Company
SPRINGFIELD, OHIO

NEW COMPUTER INTERCEPT



New equipment for placing any TPL or TPS number or combination on intercept by the patch-cord arrangement within Computer field. Easy to install. Standard relays.

ASK FOR COMPUTER INTERCEPT BULLETIN

Universal Also manufactures Digit Absorbers and Code-to-Selective Ringing Converters.

UNIVERSAL CONTROLS CORPORATION
P. O. BOX 13122 • DALLAS 20, TEXAS

Index to ADVERTISERS

	Page
Acme Visible Records, Inc.	—
Alphaduct Wire & Cable Co., The	—
Aluminum Company of America	—
American Appraisal Company, The	—
American Chain & Cable Co., The Page Steel & Wire Div.	—
American Creosoting Company	—
American Electrical Heater Co.	—
American Steel & Wire Co.	12
American Telephone & Telegraph Co.	38-39
Anaconda Wire & Cable Co.	—
Ansonia Wire & Cable Co., The	—
Armstrong Cork Co., Glass Insulator	—
Arrow Fastener Co.	—
Atlantic Creosoting Co., The	53
Atlas Instrument Co.	—
Automatic Electric Sales Co.	8-9, 28-29, 35, 55
Bakelite Company	—
Baker Wood Preserving Co.	52
Bartlett Tree Experts	—
Bashlin Company, W. M.	—
Bell Telephone Laboratories, Inc.	—
Benner-Nawmann, Inc.	50
Berry & Co., L. M.	16
Bethlehem Steel Co.	—
Bishop Mfg. Co.	—
Blaw-Knox Company	7
Bohnsack Equipment Co.	52
Brach Mfg. Corp.	—
British Insulated Callendars Cables, Ltd.	—
Buckeye Telephone & Supply Co.	51
Burgess Manning Company	—
Burroughs Corp.	—
C&D Batteries, Inc.	47
Cabaniss-Pogue Company	53
Cable Breather Corp.	—
Cable Spinning Equipment Co.	—
Calculagraph Company	—
Chance Co., A. B.	49
Chase Brass & Copper Co.	—
Cleverly Electrical Works, The	52
Coffing Hoist Div.	—
Commercial Cord & Supply Co.	49
Cook Electric Company	—
Copperweld Steel Co.	—
Crane, Inc., Carl C.	53
Cullom & Ghertner	52
Davis Construction Co.	53
Donnelley & Sons, R. R.	—
Dow Chemical Co., The	23
Du Pont de Nemours & Co., E. I.	41
Duo-Safety Ladder Corp.	—
Eastman Chemical Products, Inc.	—
Electric Specialty Co.	—
Electromode Div.	—
Everstick Anchor Co.	—
Exide Industrial Division— The Electric Storage Battery Co.	—
Fitchburg Engineering Corp.	48
Foley Constr. Corp., Robert E.	53
General Cable Corporation	13
General Electric Company	—
General Insualted Wire Works, Inc.	48
General Machine Products Co., Inc.	—
General Telephone Directory Co.	—
Gorman-Rupp Company	—
Gould-National Batteries, Inc.	—
Graybar Electric Co.	24-25
Greenlee Tool Co.	—
Haley & Co., R. G.	—
Harris-McBurney Company	—
Henkels & McCoy	53
Heywood, T. A.	53
Highway Trailer Company	—
Hirsch Organization, Inc., Gustav	—
H. J. J. Company	—
Holan Corporation, J. H.	—
Homelite Corporation	—
Hughey & Phillips, Inc.	—
Indiana Steel & Wire Co.	—
International Business Machine Corp.	—
International Harvester Co.	—
International Standard Trading Corp.	—
Irwin-Auger Bit Co., The	—
Johns-Manville	—
Kander and Company, Allen	—
Katolight Corp.	—
Kearney Co., Jas. R.	—
Kellogg Switchboard & Supply Co.	4-5
Klein & Sons, Mathias	—
Koiled Kords, Inc.	50
Koppers Co., Inc.	—
Leich Sales Corporation	10-11
Lindsay Telephone & Supply Co.	45
Line Material Co.	—
Linen Thread Co., Inc.	—
Lorain Products Corp., The	44
Lowell Insulated Wire Company	—
Markwell Mfg. Co., Inc.	—
McCabe-Powers Auto Body Co.	—
McFarland Company, L. D.	53
Monsanto Chemical Co.	—
Morton Contracting Co.	53
Murphy Engineering Laboratories	—
Natco Corporation	—
National Carbon Div.	—
National Pole & Treating Div.	53
National Telephone Supply Co.	56
Neale Construction Co.	53
North Electric Company	14-15
Onan & Sons, D. W.	—
Overton Co., S. E.	—
Owens-Illinois	—
P & A Manufacturing Co.	54
Page & Hill, Inc.	—
Plastic Wire & Cable Corp.	—
Plymouth Motor Div.	—
Porcelain Products, Inc.	—
Porter, H. K., Inc.	—
Preformed Line Products Co.	—
Radio Engineering Products Limited	—
Raytheon Mfg. Co.	—
Rebuilt Electric Equipment	—
Recordak Corp.	—
Reliable Electric Co.	—
Remington Rand, Inc.	—
Republic Creosoting Company	—
Rex Corporation, The	—
Reynolds Metals Company	—
Roebling's Sons Co., John A.	—
Rolatape, Inc.	—
Runzel Cord & Wire Co.	—
S&G Manufacturing Corp.	46
Schauer Mfg. Co.	—
Seymour Smith & Sons, Inc.	—
Sierra Electronic Corp.	—
Sloan, Cook & Lowe Co.	53
Soapstone Duct Co.	—
Stewart Bros.	—
Stromberg-Carlson Co.	2-3, 37, 42-43, 52
Superior Cable Corporation	—
Superior Electric Service Co.	—
Suttle Equipment Co.	53
Taylor-Colquitt Co., The	—
Telectric Co., The	52
Tel-E-Lect Products, Inc.	—
Telephone & Power Supply Co.	53
Teletype Corporation	—
Tele-Wire Supply Co., Inc.	—
Telkor, Inc.	—
Templeton, Kenly & Co.	—
Transandean Associates, Inc.	—
Tudor & Yager, Inc.	53
United States Independent Telephone Assoc.	—
United States Steel Corp. American Steel & Wire Co.	12
Coal Chemical Div.	—
Universal Controls Corp.	54
Utility Equipment Co.	53
Warn Mfg. Co.	—
Watchemoket Optical Co., Inc.	—
Weikel Mfg. Co., The	51
Western Electric Co.	—
Wheelock Signals, Inc.	—
Whitney Blake Co.	—
Williams Inspection Co., Inc., A. W.	53
Willys Motors, Inc.	—
Wiremold Co., The	—
Wyoming Valley Equipment Div.	53
Yankee Tools, a division of Stanley Tools	—
York-Hoover Corporation	—

XUM

Thermoplastic cable—as made by General Cable Corporation—*is* tough! Supertel Cable has a rugged polyethylene "hide" that's sunlight-resistant and fights moisture. It's "ornery" enough to stand up to roadside grease and oil too. But with *all* this—it's still lighter, and easier to handle. This means smaller and less experienced crews can string the cable faster and with lighter equipment — *and* with resultant "mark downs" in cost.

General Cable Corporation has been making telephone cable for over seventy years. They produce a top-quality, long-lasting thermoplastic cable which is available in standard sizes up to 404 pairs in 19, 22, and 24 AWG. Each conductor is insulated with polyethylene.

Getting Supertel Cable is very simple. Just order from your Automatic salesman or telephone the warehouse nearest you. Specify whether for aerial and duct, or for direct burial. Automatic's warehouses — which incidentally, *stock* over 2500 telephone supply items—are located in Kansas City, Chicago, Richmond, Johnson City, N. Y., and Portland, Ore.

CHICAGO	HAymarket 1-4300
JOHNSON CITY, N. Y.	Binghampton 7-8507
RICHMOND	Tel. 6-9280
KANSAS CITY	HArrison 1-4720
PORTLAND, ORE.	CApitol 3-7244

Lighter

Sun Resistant

Weather Tough

AUTOMATIC ELECTRIC

ORIGINATORS OF THE DIAL TELEPHONE

Nicotap

THE FAST, DEPENDABLE Nicopress WAY OF MAKING LINE AND DROP WIRE TAPS

THE NICO-TAP IS SPLIT

THERE IS NO NEED OF CUTTING THE LINE TO MAKE THE CONNECTION—JUST SLIP THE SLEEVE OVER THE LINE WIRE AND COMPRESS

12 BWG TO 12 BWG
Stock No. T2-109D

12 BWG TO No. 17-18 DROP WIRE
Stock No. T2-109 x 045D

17-18 B&S TO 17-18 B&S
Stock No. T2-045B

Manufactured in many different sizes and combinations

The National Telephone Supply Company

5100 SUPERIOR AVENUE • CLEVELAND 3, OHIO

Canadian Mfr.—N. SLATER CO., LTD., HAMILTON, ONT., CANADA

Export Distributor—INTERNATIONAL STANDARD ELECTRIC CORP., NEW YORK, N. Y.

Nicopress is the Registered Trade Mark of The National Telephone Supply Company

THE NATIONAL TELEPHONE SUPPLY COMPANY

ASK YOUR JOBBER

XUM